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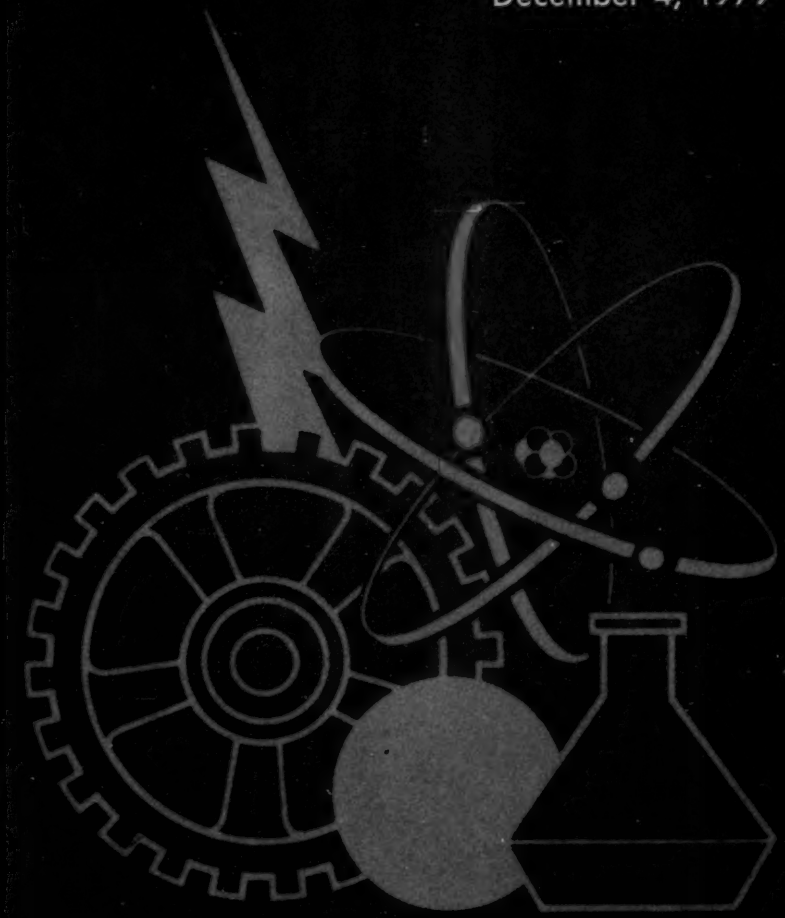

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OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

December 4, 1979 Volume 989 Number 1

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PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT, including the amounts of the fees thereunder and the States that may be designated in international applications, consult the notice entitled "Update of information concerning the Patent Cooperation Treaty" appearing in the OFFICIAL GAZETTE of July 3, 1979.

Effective August 1, 1979 the international fees are increased to the following amounts:

Basic fee under PCT Rule 15.1(i) for an international application containing 30 sheets or less	$190.00
Supplemental fee to the Basic fee for each page of an international application in excess of 30 sheets	3.50
Designation fee under PCT Rule 15.1(ii)	45.00

July 3, 1979.

LUTRELLE F. PARKER,
Acting Commissioner of Patents and Trademarks.

Patent and Trademark Office Study of Court Determinations of Patent Validity/Invalidity, 1973–1977

The Patent and Trademark Office has prepared a summary of the past five years (1973–1977, inclusive) of patent litigation in the Courts of Appeals (CA), District of Courts (DCt), and Court of Claims (CtCl), including:

(1) The number and identification of cases and patents litigated; and

(2) the holdings and rate of patent validity, invalidity and infringement.

The information was extracted from the compiled notices filed in the Patent and Trademark Office by clerks of courts under the provisions of 35 U.S.C. 290, and from the reported decisions appearing in the *United States Patent Quarterly, Federal Second and Federal Supplement.*

The results of the study and of the similar study conducted for the period 1968–1972 are set forth in the accompanying table.

Court Determinations of Validity/Invalidity 1968–1972 and 1973–1977*

	1968–1972				1973–1977			
	Patents Held		Percent Invalid	Infringed	Patents Held		Percent Invalid	Infringed
	Valid	Invalid			Valid	Invalid		
Court of Appeals:								
Utility	78	173	69	64	53	137	72	51
Design	0	8	100	0	2	4	67	2
Reissue	3	9	75	3	6	13	68	6
Plant	0	0	0	0	7	0	0	7
Total	81	190	70	67	68	154	69	66
District Court:								
Utility	247	135	35	503	187	170	48	321
Design	17	9	35	45	7	15	68	34
Reissue	6	14	70	6	7	4	36	16
Plant	0	0	0	1	1	0	0	1
Total	270	158	37	555	202	189	48	372
Court of Claims:								
Utility	17	8	32	17	16	12	43	11
Design	0	0	0	0	0	0	0	0
Reissue	0	1	100	0	1	1	50	0
Plant	0	0	0	0	0	0	0	0
Total	17	9	35	17	17	13	43	11
Grand Total	368	357	49	639	287	356	55	449

*This table compares data for 1973–1977 with data for 1968–1972 which were previously published in 144 Patent, Trademark & Copyright Journal at F-1 (Sept. 13, 1973). The methodology of the two studies is the same—the validity or invalidity of a given patent has been determined by tabulating the holding of the highest court in which the litigation was conducted and such holdings were made in each five year period. Where two or more courts concurred in holding the same patent valid or invalid, that patent was counted as valid or invalid only once in each five year period. Consequently, no attempt should be made to add tabulated data for 1973–1977 to similar tabulated data for 1968–1972 to obtain overall tabulated data for 1968–1977. Inasmuch as some holdings of validity or invalidity at the District Court level in 1968–1972 were duplicated (either affirmed or reversed) at the Court of Appeals level in 1973–1977, such an attempt to add tabulated data would result in some patents being counted twice in the 10 year period.

Explanatory Remarks

In the interest of clarity and elimination of any misconception as to the meaning and interpretation of the data tabulated above, the following explanation is offered.

Number of Patents: The number of individual patents litigated during the 1973–1977 five year period, in which the suit was terminated by dismissal, consent judgment, summary judgment, or holdings of validity, invalidity, injunction, etc., was approximately 2,017 (2,025 in 1968–1972). Of those, the number of patents in which there was judgment of validity, invalidity or infringement totalled 876[1] (989 in 1968–1972)

For reference purposes, it is noted that during this five year period, the Patent and Trademark Office issued approximately 382,000 patents. The percentage of patents litigated (2,017) with respect to the total number of patents issued over this five year period is 0.53%. Further, the number of patents issued by the Patent and Trademark Office covering the time span from the earliest reported litigated patent included in this study (#2,129,332) to the latest reported litigated patent included in the study (#3,995,102) is approximately 1,865,000. The percentage of patents litigated (2,017) with respect to this number is 0.011%.

Patents Held Valid or Invalid: Methods of calculation of validity data vary. For instance, the data may be (a) inclusive of each individual court holding of validity or invalidity, (b) limited to holdings within each of the judicial circuits, (c) restricted to a single holding representing the final adjudication of the patent's validity, or (d) directed only to the decisions of the appellate courts.

[1] Excluded from that number are: (1) awards of priority for or against patentees in interference proceedings; (2) nine patents in which invalidity was predicated on collateral estoppel (*Blonder-Tongue Laboratories, Inc. v. Univ. of Illinois Foundation,* 402 U.S. 313 (1971)) resulting from an adjudication of invalidity occurring prior to January 1, 1973; (3) reported holdings of validity (three) or invalidity (one) rendered by state courts; and (4) holdings of validity (four) by the International Trade Commission.

In this study, the validity or invalidity of a given patent has been determined by tabulating the result of decision of the highest court in which the litigation was conducted and such holdings were made. Where two or more courts concurred in holding the same patent valid or invalid, that patent was counted as valid or invalid only once. In the rare instances where conflicting decisions on validity by coordinate tribunals have occurred, the patent was counted as invalid. It was noted that many court opinions and § 290 notices did not print out whether all, or only some, of the claims of a patent were held valid or invalid. Where it was observed that the court held only some claims of a given patent invalid and made no explicit findings of validity with respect to the remaining claims, the patent was counted as invalid, notwithstanding the presumption of validity accorded the remaining claims by 35 U.S.C. 282 and with full recognition that the resultant statistics would be biased unfavorably toward invalidity as a result. Where a court did explicitly hold some claims valid and other claims invalid, the patent was counted as valid, inasmuch as the patent remains in force with valid claims therein. A consent judgment of validity or invalidity, where denominated as such in the § 290 notice, was counted as a holding of validity or invalidity.[2] However, infringement and injunction holdings, without any mention of validity, were *not* presumed or counted as holdings of validity.

[2] The number of consent judgments of validity totalled approximately 50, and there was one consent judgment of invalidity.

Rate of Patent Invalidity: The term "rate of patent invalidity" appears to have no recognized definite meaning. Such rate may be calculated as a percentage of total patents litigated or only as a percentage of those litigated patents having a holding of validity or invalidity. The latter base has been employed in this study.

It is to be stressed that there is no evident link between the characteristics of the litigated patents which caused them to be litigated and the characteristics of the remaining unlitigated patents which would justify the conclusion that the rate of invalidity noted above can be extrapolated to, or is in any way representative of, the total patent universe.

Infringement: Instances of infringement are not always indicated in the report of the courts' decisions. Often there is no explicit holding that a claim is infringed, although such conclusion would be implicit because the court enjoined the defendant from making, using or selling certain devices. Accordingly, in the absence of any countervailing information, an injunction has been counted as a holding of infringement for statistical purposes. The number of individual patents held to be infringed totalled approximately 449, compared to 540 in the period of 1968–1972.[3]

[3] For the period 1968–1972, the infringement tabulations appearing in the table correspond to holdings of infringement, i.e., many patents were held—and counted—as infringed more than once. In contrast, for the period 1973–1977, a given individual patent held infringed more than once was counted as infringed only once.

Discussion

The Patent and Trademark Office views this study as far more comprehensive and accurate than studies heretofore undertaken which have examined merely, for the most part, reported decisions of the Courts of Appeals. Those previous studies are included as a bibliography to this study.

It is to be noted that the percentage of litigated patents held invalid by the Courts of Appeals (69%) in the five year period 1973–1977 covered by this study corresponds closely to the invalidity percentages found by the other authors and studies mentioned in the bibliography for the period 1940–1972, including the 70% rate found by the previous PTO study for the period 1968–1972. However, the inclusion in this study of unappealed and unreported judgments of the District Courts to obtain a resultant total rate of patent invalidity of approximately 55% places the entire litigated patent validity/invalidity picture in better perspective.

Nevertheless, certain inadequacies in the information available from the 35 U.S.C. 290 notices could result in potentially erroneous statistics even in this study. In that connection, it was found that the notices submitted under 35 U.S.C. 290 had the following defects:

(1) Notices of decisions rendered were not filed in *every* case;[4]

[4] On many occasions, the existence and result of District Court litigation conducted in 1973–1977 was discovered only on reading a later-reported appellate court decision and opinion.

(2) When filed, the notices were not necessarily submitted promptly; and

(3) The data in the notices were incomplete, and, in many instances, incorrect. For example, mere notations of dismissal, which were often indiscriminately employed in the § 290 notices, were found to stand for holdings of validity or invalidity upon comparison with any reported decisions corresponding to those § 290 notices.

A particularly serious problem appears to have developed with respect to 35 U.S.C. 290 notices filed by clerks of the U.S. Circuit Courts of Appeals. Few notices of decision rendered in the Circuit Courts have been received by the Patent and Trademark Office and published in the Official Gazette in the period 1973–1977. Only the 6th Circuit Court of Appeals and, to a lesser degree, the 1st Circuit Court of Appeals, have more or less consistently filed such notices with the Office. That factor, coupled with an increasing tendency by the Federal Courts in general since 1973 to decide litigation accompanied by an unpublished opinion,[5] gives reason for concern with respect to the completeness and accuracy of the data tabulations which have been gathered largely from reported decisions of the Courts of Appeals.

[5] For example, the published decision and opinion of the District Court in *Azoplate Corp.* v. *Silverlith, Inc.*, 367 F. Supp. 711, 180 USPQ 616 (D.Del. 1973) (concerning which the Office received notice under § 290) was affirmed, 506 F. 2d 1050, 184 USPQ 577 (3rd Cir. 1974) without published opinion and without apparent notice to the Office of the Circuit Court's decision. For purposes of this study, no attempt was made to "Shepardize" reported or unreported District Court decisions involving nearly 400 patents to determine whether a Circuit Court decision in the same case appears in a table of unpublished decisions and opinions.

Additionally, it may be noted that a summary limited to a "five year" period involves certain factors that give an incorrect impression. Thus, aside from the obvious effects of subsequent appeals, a dismissal in one suit (within the five year period) subsequent to, or prior to, a final adjudication of the same patent's validity, or invalidity, in another suit (outside the five year period) has significance different from that of a dismissal in the absence of any other decision. In other words, the complete history of the patent is necessary to a proper appreciation of the patent's validity or invalidity.

Bibliography

(1) Baum, "The Federal Courts and Patent Validity: An Analysis of the Record," 56 JPOS 758 (December 1974).

(2) Bjorge and Beha, "Patent Validity/Invalidity Study," Policy Planning Staff Project 73–2, Patent and Trademark Office, U.S. Dept. of Commerce, April 3, 1974.

(3) Chognard, "Patent Litigation and Validity," 41 JPOS 291 (1959).

(4) Dearborn et al., *Encylopedia of Patent Practice and Invention Management* (Calvert), page 22, et seq. examined 734 adjudicated patents in the circuit courts from 1953–63.

(5) Federico, "Adjudicated Patents 1948–54," 38 JPOS 233, 244, reported on adjudications from 1925–54.

(6) Gausewitz, "Brief in Support of Proposed Amendment to Section 103, Title 35, Patents, U.S. Code," 51 JPOS 290 (May 1969).

(7) Horn et al., "The Federal Courts' View of Patents—A Different View," 55 JPOS 134 (March 1973) studied 597 adjudicated patents from January 1961 through December 1970.

(8) Koenig, dissertation submitted in partial fulfillment of requirements for S. J. D. degree, New York University Law School, December 1971. She studied adjudications of 854 patents from 1953–67.

(9) Koenig, *Patent Invalidity: A Statistical and Substantive Analysis, C.* Boardman Co., Ltd.: New York, 1974).

(10) Moxon, "Patent Invalidity Study," unpublished, January 17, 1973, examined 284 adjudicated patents in the period 1967–71.

(11) Senate Report No. 167, 90th Congress, 1st Session examined validity of 46 patents before *Graham* v. *John Deere*, 383 U.S. 1 (1966) and 38 patents subsequent to *Graham*.

(12) Tegtmeyer, "For Greater Patent Validity," American University Law Review, Vol. 19, No. 1 (December 1969) studied 869 adjudicated patents from 1953–68.

(13) U.S. Patent Office, *Further Studies on Patent Validity/Invalidity on a Circuit-by-Circuit Basis*, 1968–1972, 165 Patent, Trademark & Copyright J. at D–1 (Feb. 14, 1974).
(14) U.S. Patent Office, *Patent Office Study of Court Determinations of Validity/Invalidity*, 1968–1972, 144 Patent, Trademark & Copyright J. at F–1 (Sept. 13, 1973).
See also Howard T. Markey, "The Status of the U.S. Patent System-Sans Myth, Sans Fiction," 59 JPOS 164 (March 1977), who summarizes the results found by some of the above authors or studies, and includes additional bibliography.

Additional Information

For additional information concerning the Patent and Trademark Office's 1973–1977 study, contact Mr. Gerald H. Bjorge, 703–557–3584.

Date: Nov. 1, 1979.

LUTRELLE F. PARKER,
Acting Commissioner of Patents and Trademarks.

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

Re. 29,786, Re. S.N. 062,573, Filed Jul. 31, 1979, Cl. 334/86, COMBINED 82-POSITION UHF AND VHF TELEVISION TUNER WITH MEMORY FINE TUNING, Morton L. Weigel, Owner of Record: *Sarkes Tarzian, Inc., Bloomington, Ind.*, Attorney or Agent: Richard D. Mason, et al., Ex. Gp.: 256

3,062,536, Re. S.N. 066,883, Filed Aug. 16, 1979, Cl. 271/195, SHEET STRIPPING APPARATUS, John Rutkus, Jr., et al., Owner of Record: *Haloid Xerox Inc., Rochester, N.Y.*, Attorney or Agent: Harvey M. Brownrout, et al., Ex. Gp.: 313

3,347,691, Re. S.N. 066,884, Filed Aug. 16, 1979, Cl. 427/20, XEROGRAPHIC DEVELOPMENT, James M. Lyles, Owner of Record: *Xerox Corporation, Rochester, N.Y.*, Attorney or Agent: Harvey M. Brownrout, et al., Ex. Gp.: 162

3,378,276, Re. S.N. 056,181, Filed Jul. 10, 1979, Cl. 280/43.23, HYDRAULICALLY OPERATED DEMOUNTABLE RUNNING GEAR WITH DIAGONAL RAMS, George M. Fulmer, Owner of Record: *Geichner Mobile Systems, a division of The Union Corporation, Verona, Pa.*, Attorney or Agent: Martin Fleit, et al., Ex. Gp.: 316

3,578,827, Re. S.N. 069,319, Filed Aug. 24, 1979, Cl. 308/5, ARRANGEMENT FOR PROVIDING PRECISE MOVEMENT, Joseph E. Smith, Owner of Record: *Excellon Industries, Torrance, Calif.*, Attorney or Agent: Richard F. Carr, et al., Ex. Gp.: 243

3,601,379, Re. S.N. 069,189, Filed Aug. 23, 1979, Cl. 266/192, COOLING STRUCTURE FOR A METALLURGICAL FURNACE, Karl-Heinz Langlity, et al., Owner of Record: *Demag Aktiengesellschaft, Duisburg, Germany*, Attorney or Agent: David Toren, et al., Ex. Gp.: 111

3,755,715, Re. S.N. 058,011, Filed Jul. 16, 1979, Cl. 361/120, LINE PROTECTOR HAVING ARRESTER AND FAIL-SAFE CIRCUIT BYPASSING THE ARRESTER, Milton A. Klayum, et al., Owner of Record: *Reliable Electric Company, Franklin Park, Ill.*, Attorney or Agent: Richard R. Trexler, et al., Ex. Gp.: 212

3,756,212, Re. S.N. 932,453, Filed Aug. 10, 1978, Cl. 123/148 E, ARRANGEMENTS FOR ELECTRONICALLY DETERMINING AND ADJUSTING THE IGNITION TIME OF AN INTERNAL COMBUSTION ENGINE, Gunter Schirmer, et al., Owner of Record: *Robert Bosch G.m.b.H., Stuttgart, Germany*, Attorney or Agent: Michael J. Striker, et al., Ex. Gp.: 340

3,869,182, Re. S.N. 068,780, Filed Aug. 22, 1979, Cl. 308/187.2, BALL BEARING, Nils Bertil Glifberg, Owner of Record: *Svenska Sockerfabriks Aktiebolaget, Malmo, Sweden*, Attorney or Agent: Joseph A. DeGrandi, et al., Ex. Gp.: 243

3,903,665, Re. S.N. 957,516, Filed Nov. 3, 1978, Cl. 52/171, HEAT ENERGY TRANSMISSION CONTROL PANEL, David C. Harrison, Owner of Record: *Inventor*, Attorney or Agent: George M. Schwab, Ex. Gp.: 350

3,915,501, Re. S.N. 070,934, Filed Aug. 29, 1979, Cl. 299/67, MOUNTING ARRANGEMENT FOR IMPACT ROCK-BREAKER, Delwin E. Cobb, et al., Owner of Record: *Caterpillar Tractor Co., Peoria, Ill.*, Attorney or Agent: Ralph E. Walters, et al., Ex. Gp.: 354

3,936,566, Re. S.N. 070,711, Filed Aug. 29, 1979, Cl. 428/323, PRESSURE SENSITIVE RECORD MATERIAL EMPLOYING DIARYL ALKANE SOLVENTS, Atsushi Sato, et al., Owner of Record: *Nippon Petrochemicals Co., Ltd., Tokyo, Japan*, Attorney or Agent: Arnold B. Christen, et al., Ex. Gp.: 164

3,937,865, Re. S.N. 969,363, Filed Dec. 14, 1978, Cl. 428/413, REINFORCED PLASTICS CARRIER FOR PRINTED CIRCUITS, Hendrik Jongetjes, Owner of Record: *Papierfabrieken Van Gelder Zonen N.V., Amsterdam, Netherlands*, Attorney or Agent: John P. Snyder, et al., Ex. Gp.: 160

4,030,213, Re. S.N. 067,362, Filed Aug. 17, 1979, Cl. 36/30 R, SPORTING SHOE, Alexander C. Daswick, Owner of Record: *Inventor*, Attorney or Agent: Vernon D. Beehler, et al., Ex. Gp.: 353

4,033,846, Re. S.N. 053,530, Filed Jun. 28, 1979, Cl. 204/247, APPARATUS FOR GAS COLLECTION IN ALUMINIUM SMELTING FURNACES, Arne Engesland, Owner of Record: *Lista OG Mosjoen Aluminiumverk, Elkem Aluminum A/S & Co., Oslo, Norway*, Attorney or Agent: William D. Lucas, et al., Ex. Gp.: 114

4,047,607, Re. S.N. 070,457, Filed Aug. 28, 1979, Cl. 400/208, ARTICULATED RIBBON-GUIDING STRUCTURE, Frederick P. Willcox, Owner of Record: *Inventor*, Attorney or Agent: William D. Hall, et al., Ex. Gp.: 337

4,049,962, Re. S.N. 069,235, Filed Aug. 23, 1979, Cl. 250/202, LINE EDGE FOLLOWER, George H. Kallen, Owner of Record: *Union Carbide Corporation, New York, N.Y.*, Attorney or Agent: Harrie M. Humphreys, et al., Ex. Gp.: 252

4,057,977, Re. S.N. 085,436, Filed Oct. 25, 1979, Cl. 62/324, REVERSE CYCLE HEAT PUMP CIRCUIT, Leo B. Chambless, Owner of Record: *General Electric Company, Louisville, Ky.*, Attorney or Agent: Frederick P. Weidner, et al., Ex. Gp.: 344

4,066,659, Re. S.N. 065,873, Filed Aug. 13, 1979, Cl. 260/326.13 F, METHOD OF PREPARATION OF 3-(3-CARBOXY-4-HYDROXYPHENYL)-4,5-DIHYDRO-2-PHENYLBENZ (E)INDOLE AND VALUABLE INTERMEDIATES RELATED THERETO, Richard C. Effland, Owner of Record: *American Hoechst Corporation, Bridgewater, N.J.*, Attorney or Agent: Henry W. Koster, Ex. Gp.: 122

4,075,341, Re. S.N. 032,205, Filed Apr. 23, 1979, Cl. 424/258, 2-SUBSTITUTED PHENYL-5-TRIAZOIS [5,1-A] ISOQUINOLINE COMPOUNDS, Amedeo Omodei-Sale, et

al., Owner of Record: *Gruppo Lepetit S.P.A., Milan, Italy,* Attorney or Agent: Richard G. Waterman, et al., Ex. Gp.: 125

4,095,061, Re. S.N. 068,474, Filed Aug. 20, 1979, Cl. 200/48 KB, GROUP OPERATED CIRCUIT DISCONNECT APPARATUS FOR OVERHEAD ELECTRIC POWER LINES, Ronald P. Bridges, Owner of Record: *Inventor,* Attorney or Agent: Ernest A. Wegner, et al., Ex. Gp.: 241

4,099,120, Re. S.N. 055,625, Filed Jul. 9, 1979, Cl. 324/158 P, PROBE HEAD FOR TESTING PRINTED CIRCUIT BOARDS, Akin Aksu, Owner of Record: *Inventor,* Attorney or Agent: Francis A. Utecht, et al., Ex. Gp.: 252

4,101,830, Re. S.N. 50,695, Filed Jun. 21, 1979, Cl. 324/158 F, MERCURY PROBE, John H. Greig, Owner of Record: *MSI Electronics Inc., Woodside, N.Y.,* Attorney or Agent: Paul S. Martin, Ex. Gp.: 252

4,104,780, Re. S.N. 063,754, Filed Aug. 6, 1979, Cl. 29/107, METHOD AND SYSTEM FOR TIGHTENING JOINT ASSEMBLY, Jerry A. Sigmund, Owner of Record: *SPS Technologies, Inc., Jenkintown, Pa.,* Attorney or Agent: Aaron Nerenberg, et al., Ex. Gp.: 321

4,105,514, Re. S.N. 064,651, Filed Aug. 7, 1979, Cl. 114/204, PROCESS FOR ELECTROLYSIS IN A MEMBRANE CELL EMPLOYING PRESSURE ACTUATED UNIFORM SPACING, David D. Justice, et al., Owner of Record: *Olin Corporation, New Haven, Conn.,* Attorney or Agent: Bruce E. Burdick, et al., Ex. Gp.: 114

4,106,476, Re. S.N. 068,711, Filed Aug. 22, 1979, Cl. 126/140, DOOR FOR FIREPLACE SCREEN, Robert W. Harsha, Owner of Record: *Pacific Fence & Wire Co., Portland, Oreg.,* Attorney or Agent: Daniel P. Chernoff, et al., Ex. Gp.: 345

4,159,914, Re. S.N. 068,927, Filed Aug. 23, 1979, Cl. 136/89 TF, PHOTOVOLTAIC CELL, John F. Jordan, et al., Owner of Record: *Photon Power, Inc., El Paso, Tex.,* Attorney or Agent: Edmund F. Bard, et al., Ex. Gp.: 114

PATENT NOTICES

Certificates of Correction for the Week of Dec. 4, 1979

D. 251,848	4,114,928	4,151,616	4,163,710
D. 252,504	4,115,072	4,151,844	4,164,215
3,616,058	4,115,348	4,152,200	4,164,334
3,887,813	4,115,383	4,152,511	4,164,352
3,888,693	4,116,929	4,152,959	4,164,378
3,899,210	4,117,371	4,153,164	4,164,449
3,919,327	4,118,425	4,153,203	4,164,560
3,967,492	4,118,435	4,153,831	4,165,014
3,969,196	4,119,194	4,153,975	4,165,217
3,978,457	4,119,646	4,154,154	4,165,552
4,001,926	4,121,660	4,155,829	4,165,820
4,004,284	4,121,958	4,155,927	4,165,831
4,004,936	4,124,707	4,156,194	4,166,040
4,015,645	4,127,846	4,157,585	4,166,139
4,028,354	4,128,604	4,157,846	4,166,151
4,029,961	4,130,509	4,158,072	4,166,270
4,032,536	4,131,069	4,158,124	4,166,303
4,049,574	4,134,993	4,158,504	4,166,614
4,054,948	4,135,245	4,158,982	4,166,653
4,061,569	4,137,802	4,159,267	4,166,722
4,061,845	4,138,325	4,159,318	4,166,776
4,064,810	4,138,466	4,159,488	4,166,781
4,066,591	4,138,734	4,160,039	4,166,968
4,067,004	4,138,992	4,160,131	4,167,103
4,070,117	4,139,125	4,160,243	4,167,311
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4,086,144	4,145,734	4,162,453	4,167,817
4,092,867	4,145,828	4,162,600	4,167,818
4,096,130	4,146,528	4,162,662	4,167,823
4,096,769	4,146,805	4,162,741	4,168,186
4,100,385	4,147,585	4,162,906	4,168,414
4,103,385	4,149,952	4,163,022	4,168,419
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4,110,760	4,151,199	4,163,341	4,168,930
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Disclaimers

3,519,674.—*Yael Arad, Moshe Levy* and *Haim Rosen,* Tel Aviv, and *David Vofsi,* Rehovoth, Israel. HYDRODIMERIZATION OF ACRYLIC ACID DERIVATIVES. Patent dated July 7, 1970. Disclaimer filed May 24, 1979. by the assignee, *U.C.B., Societe Anonyme.*

Hereby enters this disclaimer to all claims of said patent.

3,547,975.—*Yael Arad,* Tel Aviv, *Moshe Levy* and *David Vofsi,* Rehovoth and *Haim Rosen,* Ramat Gan, Israel, PROCESS FOR THE HYDRODIMERIZATION OF ACRYLIC ACID DERIVATIVES. Patent dated Dec. 15, 1970. Disclaimer filed May 24, 1979, by the assignee, *U.C.B., Societe Anonyme.*

Hereby enters this disclaimer to all claims of said patent.

3,674,998.—*Hanspeter Benz,* Santa Clara County, Calif. METHOD AND APPARATUS FOR AUTOMATIC PHASE CONTROL IN A FOURIER ANALYZED READ-OUT OF IMPULSE RESONANCE DATA. Patent dated July 4, 1972. Disclaimer filed Sept. 18, 1978, by the assignee, *Varian Associates, Inc.*

Hereby enters this disclaimer to all claims of said patent..

Disclaimer and Dedication

3,488,041.—*Russell A. Powell* and *Jack Hyde,* Pittsburgh, Pa. BLAST FURNACE STOVE. Patent dated Jan. 6, 1970. Disclaimer and Dedication filed Oct. 3, 1979, by the assignee, *Koppers Company, Inc.*

Hereby disclaims and dedicates to the Public the remainder of the term of said patent.

National Technical Information Service

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The inventions listed below are owned by the U.S. Government and are available for domestic and possibly foreign licensing in accordance with the licensing policies of the agency-sponsors.

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Requests for licensing information on a particular invention should be directed to the address cited for the agency-sponsor.

DOUGLAS J. CAMPION,
Patent Program Coordinator, National Technical Information Service.

U.S. DEPARTMENT OF AGRICULTURE

Research Agreements and Patent Branch, General Service Division, Federal Bldg., Agricultural Research Service Hyattsville, Md. 20782

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

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Patent 4,156,548. Magnetic Suspension and Pointing System. Filed Feb. 27, 1976. Patented May 29, 1979. Not available NTIS.

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U.S. DEPARTMENT OF THE AIR FORCE
AF/JACP, 1900 Half St. S.W., Washington, D.C. 20324

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U.S. DEPARTMENT OF THE NAVY
Assistant Chief for Patents, Office of Naval Research
Code 302, Arlington, Va. 22217

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Patent application 6–042,466. Electrolytic Blocking Contact to InP. Filed May 25, 1979.

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Patent application 6–044,432. Multifunctional Transducer. Filed June 1, 1979.

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Patent 4,148,031. Phase Conjugation Method and Apparatus for an Active Retrodirective Antenna Array. Filed Mar. 16, 1977. Patented Apr. 3, 1979. Not available NTIS.

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Patent 4,151,612. Spacesuit Mobility Knee Joints. Filed Mar. 3, 1978. Patented May 1, 1979. Not available NTIS.

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Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The libraries listed herein, designated as patent depository libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent months or years in some libraries to all or most of the patents issued since 1870, or earlier, in other libraries.

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Depending upon the library, the patents may be available in microfilm, in bound volumes of paper copies, or in some combination of both. Facilities for making paper copies from either microfilm in reader-printers or from the bound volumes in paper-to-paper copies are generally provided for a fee.

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	Cleveland Public Library	(216) 623-2932
	Columbus: Ohio State University Libraries	(614) 422-6286
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Pennsylvania	Philadelphia: Franklin Institute Library	(215) 448-1226
	Pittsburgh: Carnegie Library of Pittsburgh	(412) 622-3128
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	Milwaukee Public Library	(414) 278-3043

*Collection organized by subject matter.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF NOVEMBER 3, 1979

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metallurgical Apparatus; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	5-1-79
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines: Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	10-3-78
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, Treating Processes, and Apparatus Therefor; Irradiation (Part); Bleaching; Dyeing; Leather, Fur and Textile Treating Compositions.	11-13-78
COATING, LAMINATING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes, Apparatus and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; and Photography.	2-5-79
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	5-30-78
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Horology; Acoustics; Recorders; Weighing Scales.	4-13-78
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Lubrication; Illumination; Nuclear and Reactors; Radar; Directional Radio; Torpedoes; Seismic Exploring; Cathode Ray Tube Circuitry; Cryptograph; Laser Devices; Radioactive Materials; Power Metallurgy, Rocket Fuels.	5-19-78
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—N. ANSHER, Director. Communications; Multiplexing Techniques; Television; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	2-5-79
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—A. L. SMITH, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	8-31-78
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	9-1-78
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	12-12-77
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—M. M. NEWMAN, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	8-17-78
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion-Bonding, Metal Founding; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks; Fishing, Etc.; Butchering; and Books and Printed Matter.	10-13-78
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—B. R. GRAY, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Plants; Harvesting; Earth Working and Excavating; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Information Dissemination.	11-30-78
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—D. J. STOCKING, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	5-4-78
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—G. M. FORLENZA, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Textiles; Apparel and Shoes; Sewing Machines; Machine Elements; Clutches.	7-10-78

Expiration of patents: The patents within the range of numbers indicated below expire during November 1979, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 3,061,833 to 3,066,301, inclusive
Plant Patents..... Numbers 2,189 to 2,197, inclusive

DEFENSIVE PUBLICATIONS

PUBLISHED DECEMBER 4, 1979

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawing, contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

T989,001
HYDROGEN DONOR SOLVENT EXTRACTION OF COAL

Everett Gorin, San Rafael, Calif., assignor to Continental Oil Company, Stamford, Conn.

Filed Dec. 14, 1978, Ser. No. 969,615
Int. Cl.[2] C10G *1/00, 1/06*
U.S. Cl. 208—8 LE
1 Sheets Drawing. 12 Pages Specification

A coal liquefaction process is provided in which a hydrogen donor solvent is used to at least partially liquefy the coal. The process is maintained in hydrogen donor solvent balance by treatment of products obtained in the course of the coal liquefaction process. The required balance is achieved by catalytically hydrocracking a selected portion of the relatively high boiling distillable components obtained by intensive extraction of the coal. The underlying premise is that the high boiling components of a deeply extracted coal include hydrogen donor solvents or hydrogenatable precursors thereof which may be selectively recovered by solvent fractionation to yield the desired aromatic hydrocarbons for such solvent or precursor.

T989,002
SOLVENT MAKEUP IN HYDROGEN TRANSFER EXTRACTION

Everett Gorin, San Rafael, Calif., assignor to Continental Oil Company, Stamford, Conn.

Filed Dec. 14, 1978, Ser. No. 969,616
Int. Cl.[2] C10G *1/00, 1/06*
U.S. Cl. 208—8 LE
1 Sheets Drawing. 15 Pages Specification

A coal liquefaction process is provided in which a hydrogen donor solvent is used in the liquefaction of the coal. The process is designed to maintain the hydrogen donor solvent in balance by hydrogenation of the spent hydrogen donor solvent and precursors of the hydrogen donor solvent which are generated in steps of the overall liquefaction process. The principal sources of the desired hydrogenatable precursors are a solids-free and benzene insolubles-free portion of the coal extract, and particularly the coker distillates generated by coking a non-distillable hydrocracked fraction of said solids-free and benzene insolubles-free portion.

T989,003
SOLVENT MAKEUP IN SOLVENT EXTRACTION OF COAL

Everett Gorin, San Rafael, Calif., assignor to Continental Oil Company, Stamford, Conn.

Filed Dec. 14, 1978, Ser. No. 969,750
Int. Cl.[2] C10G *1/00, 1/06*
U.S. Cl. 208—8 LE
1 Sheets Drawing. 14 Pages Specification

A coal liquefaction process is provided in which a hydrogen donor solvent is used to at least partially liquefy the coal. The process is maintained in hydrogen donor solvent balance by treatment of selected products obtained in the course of the coal liquefaction process. The required balance is achieved by a series of inter-related operations performed on a hydrofined portion of a solids-free fraction of the coal extract. The inter-related operations include the recovery of an aromatic hydrocarbon-rich portion from the solids-free fraction by selective recovery from the solids-free fraction and from the products of a catalytic cracking operation wherein the remaining portion of the solids-free fraction is used as a feedstock. The aromatic hydrocarbon-rich portion boils within the range of the hydrogen donor solvent, and serves as makeup solvent for the required maintenance of solvent balance.

T989,004
HYDROGEN TRANSFER SOLVENT EXTRACTION OF COAL

Everett Gorin, San Rafael, Calif., assignor to Continental Oil Company, Stamford, Conn.

Filed Dec. 14, 1978, Ser. No. 969,752
Int. Cl.[2] C10G *1/00, 1/06*
U.S. Cl. 208—8 LE
1 Sheets Drawing. 14 Pages Specification

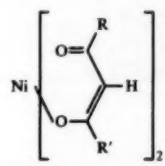
A coal liquefaction process is provided in which a hydrogen donor solvent is used in the liquefaction of the coal. The process is designed to maintain the hydrogen donor solvent in balance by hydrogenation of the spent hydrogen donor solvent and selected precursors of the hydrogen donor solvent which are generated in selected steps of the overall liquefaction process. The principal sources of the desired hydrogenatable precursors are a hydrogenated solids-free and benzene insolubles-free portion of the coal extract, and particularly the coker distillates generated by coking a non-distillable hydrocracked fraction of said hydrogenated solids-free and benzene insolubles-free portion.

T989,005
NICKEL ORGANIC COMPOSITIONS TO IMPROVE DYEABILITY OF POLYMERS

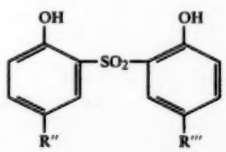
Robert W. Murray, Lebanon, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Feb. 21, 1979, Ser. No. 12,978
Int. Cl.[2] D06P *5/00*
U.S. Cl. 526—4
No Drawing. 17 Pages Specification

Nickel organic compositions prepared from a nickel salt of a 1,3-diketone of the formula



wherein R and R′ are independently C_1–C_8 alkyl; and sulfonyl dialkylphenols of the formula



wherein R″ and R‴ are independently C_1–C_{12} alkyl are used to provide polymer compositions which have improved dyeability after exposure to high temperatures. Preferably, the nickel salt of acetyl-acetone and 2,2′-sulfonylbis-(4-t-octylphenol) are reacted together and the polymer is a polyolefin. Most preferably, the polyolefin is polypropylene.

PATENTS

GRANTED DEC. 4, 1979

ERRATA

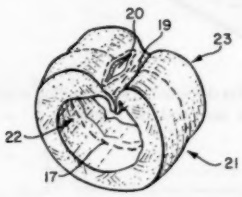
For CLASS	See PATENT NO.
433–082	4,176,453
433–119	4,176,454
409–125	4,176,585
430–308	4,176,602
171–028	4,176,750
270–071	4,176,833
235–480	4,176,855
294–078 A	4,176,874
406–128	4,176,885
430–494	4,177,071
430–302	4,177,072
430–188	4,177,073
430–286	4,177,074
435–125	4,177,106
435–176	4,177,107
435–074	4,177,108
435–024	4,177,109
548–212	4,177,191
549–064	4,177,193
585–253	4,177,217
585–379	4,177,218
585–489	4,177,219
585–505	4,177,220
525–244	4,177,221
525–432	4,177,222
427–117	4,177,308

PATENTS

GRANTED DECEMBER 4, 1979

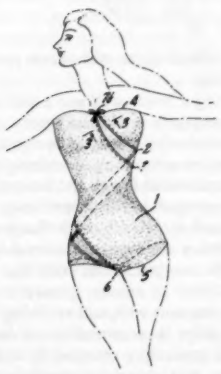
GENERAL AND MECHANICAL

4,176,407
HITTING MITT
Bert Goebel, 5466 Granada Way, and Leo Perez, 5321 Ogan Rd., both of Carpinteria, Calif. 93013
Filed Apr. 10, 1978, Ser. No. 894,743
Int. Cl.[2] A41D *13/ 3*
U.S. Cl. 2—20 **4 Claims**



1. A hitting mitt including a generally rectangular shaped pad; a cloth covering encasing said pad, said pad and cloth covering being folded about a transverse fold line mid-way of the rectangular shaped pad to form a tube shape; and stitching means securing the pad and cloth in said tube shape, said tube shape having opposite end openings and including a hole formed through the side wall of the tube shape, whereby a person can insert either his right or left hand into one of the end openings and orient said tube shape so that his thumb can extend through said hole with his fingers extending out the opposite end opening, the pad covering both the palm and back of his hand.

4,176,408
GARMENTS FORMED OF HELICALLY COILED PIECES
Harry R. de Polo, 480 Park Ave., New York, N.Y. 10022
Continuation-in-part of Ser. No. 770,034, Feb. 18, 1977, Pat. No. 4,097,933. This application Jul. 3, 1978, Ser. No. 921,180
Int. Cl.[2] A41D *7/00*
U.S. Cl. 2—69 **11 Claims**



1. A body-type garment comprising a strip of material having side edges and inclined upper and lower end edges defining at least approximately a parallelogram shape, string passages extending at least along said side edges, said strip being coiled into helical form with side edges of adjacent convolutions adjacent one another, string extending through said string passages and means for drawing said string taut and securing it to hold said side edges of adjacent convolutions adjacent one another.

4,176,409
KNIT CAP WITH MULTIPLE LAYER CONSTRUCTION AND PROCESS OF MAKING SAME
Allen D. Everitt, Milwaukee, Wis., assignor to Allen D. Everitt Knitting Company, Milwaukee, Wis.
Filed Jul. 15, 1977, Ser. No. 816,035
Int. Cl.[2] A42B *1/04*
U.S. Cl. 2—173 **5 Claims**

1. In a multi-layer knitted cap formed of a knitted tubular piece having an initial unfolded length and initial opposite open ends, the tubular piece also including a first tightly knitted gathered area equally spaced between the initial opposite open ends, the improvement comprising:

a second tightly knitted gathered area located between the first tightly knitted area and one of the initial opposite ends, said second tightly knitted area being located nearer to the first tightly knitted area than to the one initial opposite end;

a third tightly knitted gathered area located between the first tightly knitted area and the other one of the initial opposite ends, said third tightly knitted area being symmetrically and oppositely located with said second tightly knitted area relative to the first tightly knitted area;

a first fold line defined by the first tightly knitted area and along which the entirety of the initial unfolded length is folded upon itself, thereby defining a once-folded length of the tubular piece in which said second and third tightly knitted areas are located in general registry with each other and the initial opposite ends are also located in general registry with each other;

a second fold line located between the registry of the initial opposite ends and the registry of said second and third tightly knitted areas and along which the entirety of the once-folded length is folded upon itself, thereby defining a twice-folded length of the tubular piece in which said second and third tightly knitted areas are still located in general registry with each other;

a closed end defined by the initial opposite ends and said first fold line joined in general registry therein;

an open end spaced from said closed end and peripherally bounded by said second fold line;

first and second inner layers folded on themselves about said second fold line;

first and second outer layers folded on themselves and on said first and second inner layers with said first outer layer

forming the outside surface of said cap and said second outer layer forming the inside surface of said cap; and

whereby said second tightly knitted area extends circumferentially about said first outer layer and said third tightly knitted area extends circumferentially about said second outer layer and in general registry with said second tightly knitted area.

4,176,410

SPORT GOGGLE

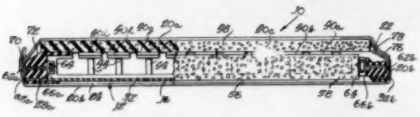
Jan H. Matthias, Greispinzgau, Austria, assignor to Carrera International Corporation, Norwood, N.J.

Filed Jun. 2, 1978, Ser. No. 912,023

Claims priority, application Fed. Rep. of Germany, Jun. 3, 1977, 7716671[U]

Int. Cl.[2] A61F *9/02*

U.S. Cl. 2—436 **13 Claims**



1. A goggle comprising a generally rectangular flexible frame having a normally planar configuration when not being worn and being bendable to conform to the wearer's head when worn, said frame being of sufficient longitudinal length to extend across the wearer's face proximate the wearer's eyes when worn and defining a substantially rectangular opening of sufficient area to permit viewing therethrough by both of the wearer's eyes,

a lens mounted on said frame within said opening and having a peripheral edge surface fully engaged by said frame when mounted thereon with the lens covering substantially the full area of said opening,

a pair of flexible straps each of which is secured to an opposite end of said frame so as to extend generally longitudinally therefrom, said straps having mutually cooperable securing means thereon facilitating attachment of the free ends of said straps together around the wearer's head at a desired tightness thereabout, said straps being of sufficient length and transverse width to overlie said opening when said straps are folded, one forwardly and one rearwardly, about said frame so as to protect the lens,

and means located substantially at each end of said frame for cooperation with an end of the strap secured to the opposite frame end so as to releasably retain said straps in said folded lens protecting positions.

4,176,411

CARDIAC ASSIST DEVICE EMPLOYING ELECTRICALLY STIMULATED ARTIFICIAL MUSCLE

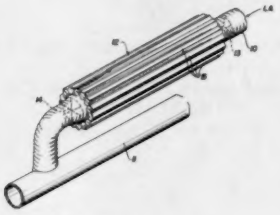
Thomas M. Runge, 2501 Galewood Pl., Austin, Tex. 78703

Filed Nov. 28, 1977, Ser. No. 855,219

Int. Cl.[2] A61F *1/24;* **A61M** *1/03*

U.S. Cl. 3—1.7 **9 Claims**

9. An artificial muscle comprising an elastomer matrix, electromagnets embedded within said matrix and adapted to be energized by remote induction means coupled with coils of the electromagnets, particles of magnetically attractable material dispersed within said matrix in spaced relationship to one another and to said electromagnets, said artificial muscle elastomer matrix formed of multiple connected rod-like segments in side-by-side relationship, a plurality of series connected axially arranged spaced electromagnets embedded centrally in each rod-like segment, and a multiplicity of said magnetically



attractable particles disposed in surrounding relationship to the electromagnets in each rod-like segment.

4,176,412

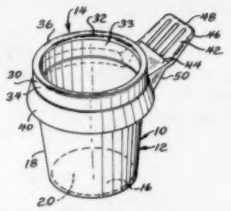
URINE COLLECTION DEVICE

James J. Peterson, Elgin, Ill., assignor to The Kendall Company, Boston, Mass.

Filed Sep. 15, 1978, Ser. No. 942,524

Int. Cl.[2] E03D *13/00*

U.S. Cl. 4—144.1 **7 Claims**



1. A device for collecting the mid-stream portion of a urine discharge, comprising:

a receptacle having a lower wall and a side wall defining a cavity, said receptacle having an upper rim defining an opening communicating with the cavity; and

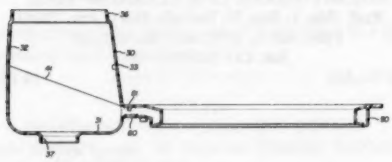
a protective member comprising a retaining portion having an inner circumferential flange and an outer circumferential flange connected by an upper edge to said inner flange, with said inner and outer flanges being spaced from each other a distance approximately equal to the thickness of the receptacle rim such that said inner and outer flanges define an annular groove to snugly receive the container rim, and with said retaining portion having a generally U-shape in cross-section and defining an upper portion of the protective member in the region of the receptacle rim, said protective member having an outwardly flared skirt depending from said outer flange and extending around at least a substantial portion of the receptacle and being closely spaced from the receptacle sidewall when the receptacle rim is received in the retaining groove, with said skirt having a lower edge extending around the receptacle sidewall beneath said retaining portion of the protective member, said protective member having an outwardly directed handle to facilitate manipulation of the device.

4,176,413

UNITARY, INTEGRAL PLASTIC TANK AND RIM FOR A TOILET, AND METHOD FOR MAKING SAME

Thomas M. Whitney, Lapeer, and Samuel C. Crosby, Ann Arbor, both of Mich., assignors to Trayco, Inc., Lapeer, Mich.

Division of Ser. No. 801,506, May 31, 1977, abandoned. This application Jun. 12, 1978, Ser. No. 914,315
Int. Cl.[2] E03D *1/24;* B29C *17/07, 17/10*
U.S. Cl. 4—300 4 Claims



1. In a method of forming an integral, unitary toilet tank and rim flush which is free of any joints, the steps of:

downwardly extruding an essentially tubular elongated parison of thermoplastic material, the parison being thinner at the top due to the weight of the parison and due to that portion of the parison being hotter as a result of its being extruded last;

positioning the tubular thermoplastic parison between the opened sections of a blow mold, each of said sections including (a) a first, generally planar surface having a central, generally oval-shaped raised region circumscribed by a pinch line for blanking out an opening in the blown part and a depression circumscribing the pinch line for forming a rim flush and (b) an essentially planar inclined portion sloping away from the first planar surface, including a cavity for forming a portion of the tank, opposed inclined minor pinch lines blending into a pinch line which is essentially parallel with the plane of the first mold surface, and an essentially semi-cylindrical indent extending between the tank cavity and the depression in the first surface;

closing the blow mold sections and thereby: (a) enclosing the thicker, bottom parison portion within a tank cavity formed by the respective partial tank cavities of the mold sections, (b) pinching the parison shut along essentially concentric oval-lines and enclosing the top parison portion within an annular mold rim cavity, and (c) enclosing the intermediate parison portion within an essentially cylindrical cavity interposed between the rim cavity and the tank cavity; and

introducing blow air under pressure into the interior of the parison portion within the tank cavity, and flowing a portion of the blow air through a restricted parison portion in the cylindrical cavity and then to the parison portion in the rim cavity to expand the thicker parison portion into contact with the tank cavity walls, to force the intermediate parison portion against the cylindrical cavity and to expand the thinner parison portion into contact with the rim cavity walls, with said thicker portion of the parison within the tank cavity being stretched and expanded to a greater extent than the other portions of the parison.

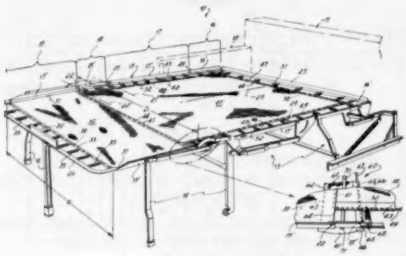
4. The product formed by the method as defined in claim 1.

4,176,414

SOFA-SLEEPER

Ronald E. Wright, Jasper, Mo.; Ronald J. Kennedy, Ennis, Tex., and Sidney A. Hiatt, Joplin, Mo., assignors to Leggett & Platt, Incorporated, Carthage, Mo.

Filed Mar. 27, 1978, Ser. No. 890,366
Int. Cl.[2] A47C *17/13*
U.S. Cl. 5—13 7 Claims



1. An improved sofa-sleeper structure comprising

a bed frame having a front bed frame section, an intermediate bed frame section, and a rear bed frame section, said front, intermediate, and rear sections being pivotable relative one to the other between a folded sofa attitude and a flat bed attitude,

a cloth front deck fixed to said front deck section, said cloth front deck being connected with the foot rail of said front deck section by a plurality of springs,

a cloth rear deck fixed to said rear deck section, said cloth rear deck being connected with the side rails of said rear deck section by a plurality of springs,

at least one stitch line fixedly connecting said cloth front deck to said cloth rear deck, said stitch line being disposed generally transverse to the longitudinal axis of said bed frame, and constituting the only direct connection between said front and rear cloth decks,

a tensioning device including a cloth flap connecting said intermediate deck frame section with the rear edge of said cloth front deck such that said tensioning device induces tension in said cloth front deck in a longitudinal direction relative to the longitudinal axis of the bed frame when said sofa sleeper structure is in the folded sofa attitude, and said tensioning device induces no tensioning in said cloth front deck when said sofa sleeper structure is in the bed attitude,

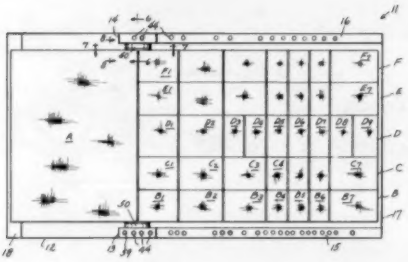
a one-piece mattress positioned in overlying fashion on said cloth front deck and said cloth rear deck when said bed frame is in the bed attitude, said mattress being doubled over onto itself between said front deck and said rear deck when said bed frame is in the sofa attitude, and

connector means connecting said one-piece mattress to said cloth front deck, and connecting said mattress to said cloth rear deck, around at least a portion of the periphery of said mattress, said connector means functioning to generally stabilize said mattress in position relative to said bed frame as said bed frame is translated between the sofa and bed attitudes, said connector means locating said mattress in general bed position when said bed frame is moved from the sofa attitude to the bed attitude for minimizing re-positioning of said mattress on said bed frame prior to use, and said connector means also locating said mattress in sofa position when said bed frame is in the sofa attitude for minimizing undue stress on said linkage structure as said mattress, bed frame and linkage is moved from the bed attitude to the sofa attitude.

4,176,415
LOUNGE WITH ARTICULATED SIDE-BY-SIDE INDEPENDENTLY ADJUSTABLE LONGITUDINAL SECTIONS

Evelyn C. Dickerson, 415 N. Ireland St., Burlington, N.C. 27215, and Ronald B. Jones, 901 Sixth St., SW., Washington, D.C. 20024

Filed Mar. 31, 1978, Ser. No. 892,164
Int. Cl.[2] A47C *21/00*
U.S. Cl. 5—66 13 Claims

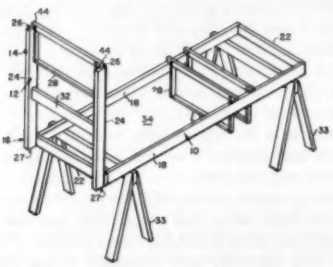


1. A furniture article comprising a base support, an angularly adjustable main forward section pivoted to said base support for rotation on a main fixed transverse horizontal axis, means to lock said forward section in an adjusted angular position, a plurality of side-by-side rearwardly extending longitudinal additional sections independently pivoted to said base support for rotation on said main transverse horizontal axis, means to lock said additional sections in independently adjusted angular positions, wherein said additional longitudinal sections each comprises a plurality of hinged segments, means to lock the segments in angularly adjusted positions relative to each other, and means for independently releasing the last-named segment angular position locking means.

4,176,416
BEE FRAME CADDY

William C. Brittingham, 199 Finnegan's La., North Brunswick, N.J. 08902

Filed Sep. 26, 1977, Ser. No. 836,298
Int. Cl.[2] A01K *51/00*
U.S. Cl. 6—12 R 9 Claims



1. A bee frame caddy for extrahive beekeeping operations comprising:

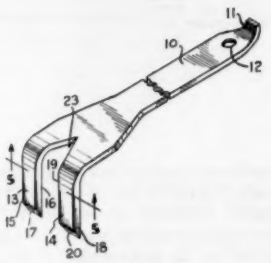
(a) a holding rack having two side bars and two end bars, joined end to end in an open rectangular configuration, defining a central rectangular opening in said rack, said side bars having top surfaces, said rack being dimensioned to receive bee frames and to permit said frames to hang from and be supported by the top surfaces of said side bars; and

(b) at least one upright inspection support having an upper end and a lower end and comprising at least two substantially parallel upright bars having top surfaces and bottom surfaces and at least one cross bar attached to and joining said upright bars, said upper end of the inspection support having an opening dimensioned to receive a bee frame and to permit said frame to hang from and be supported by the top surfaces of said upright bars, said upright inspection support being affixed in a substantially perpendicular fashion, to said holding rack.

4,176,417
ROTARY-TILLER TINE CLEANING TOOL

Glen T. Ruff, Rte. 1, Box 27, DeValls Bluff, Ark. 72041

Filed Jul. 3, 1978, Ser. No. 921,641
Int. Cl.[2] B26B *11/00*
U.S. Cl. 7—161 10 Claims



1. A tool for removing debris from a rotary soil tiller, said tool comprising:

a single piece of inflexible material having an elongate intermediate flat bar portion and first and second end portions projecting therefrom;

the first end portion being curved to define a hook extending rearwardly from said intermediate portion;

the second end portion being bifurcated and defining a pair of coplanar cutting blades extending forwardly in spaced relationship from said intermediate portion;

each of said blades having four linearly extending sides defining in transverse cross section a quadrangle of which two of the enclosed angles are acute angles, the linear junctures of the sides defining the acute angles being disposed respectively along the innermost and outermost lateral margins of each of said blades; and

the projection of said blades being equal in magnitude and at least three times the spacing therebetween.

4,176,418
APPARATUS FOR AUTOMATIC INFLATION OF DIVER FLOTATION MEANS

Lawrence S. Scott, 3570 Columbia St., Seal Beach, Calif. 90740

Filed Nov. 14, 1977, Ser. No. 851,041
Int. Cl.[2] B63C *9/24*
U.S. Cl. 9—313 8 Claims

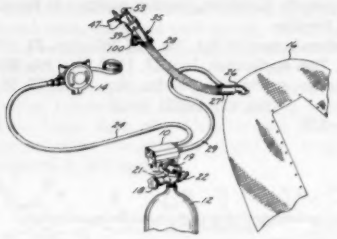
1. Apparatus for automatic inflation of diver flotation means, said apparatus comprising:

a source of air under pressure;

inflatable flotation means; and

control means connecting said source and said flotation means, including regulator means operative to convert the air pressure of said source to a lower first pressure, and

further including valve means automatically operative to apply said first pressure to said flotation means in response

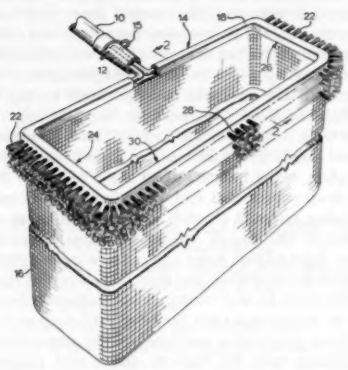


to reduction of the air pressure of said source to a predetermined reserve pressure.

4,176,419
SWIMMING POOL CLEANING DEVICE

Malcolm D. MacDonald, 46 Dogwood Crescent, Scarborough, Ontario, Canada (M1P 3N6)

Filed Aug. 22, 1978, Ser. No. 936,574
Int. Cl.[2] E04H *3/20*
U.S. Cl. 15—1.7 **7 Claims**



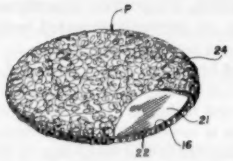
1. A swimming pool cleaning device comprising:
an elongated handle;
a frame attached to one end of the handle, said frame defining an aperture;
flexible strainer means attached to and closing the aperture defined by said frame;
brush elements protruding laterally outwardly from said frame.

4,176,420
SURFACE TREATING PAD

David J. Magid, Doylestown, Pa., assignor to Cello Chemical Company, Warrington, Pa.

Filed Jul. 3, 1978, Ser. No. 921,526
Int. Cl.[2] A47L *13/07*; B21F *45/00*
U.S. Cl. 15—230 **1 Claim**

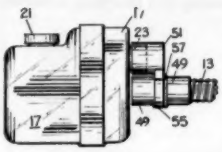
1. A pad adapted to be attached to a rotary buffing machine or the like for treating surfaces such as floors comprising, in combination, a substantially planar, disc-shaped rigid core member of stainless steel wire mesh having a top surface and a bottom surface and a marginal edge, a continuous narrow thin ribbon of stainless steel having a width between approximately 1/16 to ¼ inches and of helical configuration to provide continuous coils extending throughout its length, said ribbon being wound successively and alternately over said core member top and bottom surfaces in random directions diametrically in a plurality of wraps extending around said marginal edge, portions of said wound ribbon being randomly distributed in overlying relationship to form a circular sponge-like mass with said core member disposed centrally within said mass.



4,176,421
SUDS-MAKING AND APPLYING KIT FOR CONVERTING UPRIGHT VACUUM SWEEPERS TO RUG SHAMPOOERS

Thomas E. Baird, 2132 N. 24th St., Springfield, Ill. 62702

Filed Sep. 25, 1978, Ser. No. 945,447
Int. Cl.[2] A47L *11/34*
U.S. Cl. 15—320 **7 Claims**



1. In an upright vacuum sweeper converted into a rug-type shampooer (1) by having its rotary-brush-type suction-nozzle replaced by a shampooer unit, (2) by having its dust bag replaced by a suds-maker operatively connected to the air-discharge port of said sweeper and including a suds-discharge nipple, and (3) by having a flexible hose interconnecting said suds-maker and said shampooer unit, the suds-maker end of said flexible hose having a frictionally coupling resilient sleeve easily removably engageable over said nipple, the improvement comprising: a suds-flow-stopping cap engageable over and frictionally retainable on said nipple, said cap being attached to said sleeve, whereby loss or replacement of said cap is prevented and whereby the suds-maker end of said hose can by said cap be fastened against flopping during shampooing motions.

4,176,422
FURNITURE HINGE

Erich Röck, Höchst, and Bernhard Mages, Dornbirn, both of Austria, assignors to Julius Blum Gesellschaft m.b.H., Hochst, Austria

Filed May 4, 1978, Ser. No. 902,813
Claims priority, application Austria, May 11, 1977, 3349/77
Int. Cl.[2] E05D *7/04*
U.S. Cl. 16—130 **2 Claims**

1. A hinge for connecting together two furniture parts, said hinge comprising:
an elongated mounting plate adapted to be attached to a first furniture part along a mounting plane;
said mounting plate having a first longitudinal end adapted to be adjacent and facing a second furniture part when said mounting plate is attached to the first furniture part, said first end of said mounting plate having therein a longitudinally extending T-shaped recess defined by surfaces extending in directions longitudinally of said mounting plate and parallel to said mounting plane;

said mounting plate having a second longitudinal end spaced from said first longitudinal end and adapted to face away from the second furniture part when said mounting plate is attached to the first furniture part, said mounting plate having therein, at a position adjacent said second longitudinal end, an internally threaded bore extending transverse to said mounting plane;

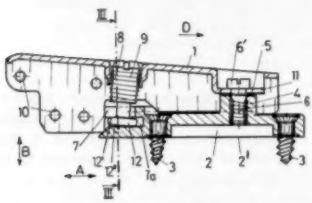
an elongated hinge arm mounted on said mounting plate;

said hinge arm having a first longitudinal end adapted to be adjacent and facing the second furniture part when said hinge arm is mounted on said mounting plate, said first longitudinal end of said hinge arm having therein bearing means for supporting hinge link axles to extend in support directions parallel to said mounting plane and transverse to said surfaces;

said hinge arm having a second longitudinal end spaced from said first longitudinal end of said hinge arm and adapted to face away from the second furniture part when said hinge arm is mounted on said mounting plate, said second longitudinal end of said hinge arm having therein a longitudinally extending slot;

said hinge arm having therein, at a position between said first and second longitudinal ends thereof, an internally threaded bore;

a fastening screw extending through said slot and being threaded into said bore in said mounting plate, such that upon loosening said fastening screw the relative longitudinal position of said hinge arm with respect to said mounting plate may be selectively adjusted;



a joint-adjusting screw having a threaded portion and an enlarged head portion, said threaded portion being threaded into said bore in said hinge arm, said enlarged head portion being longitudinally slidably received in said T-shaped recess of said mounting plate, such that relative rotation of said threaded portion of said joint-adjusting screw with respect to said bore in said hinge arm will change the relative spacing between said first longitudinal end of said hinge arm and said mounting plate; and

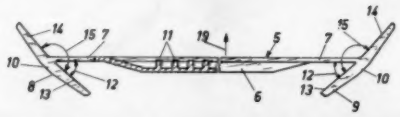
said enlarge head portion having a first surface facing away from said threaded portion and a second portion facing toward said threaded portion, said first surface comprising a conical surface diverging outwardly toward said threaded portion, said second surface comprising a truncated conical surface diverging outwardly away from said threaded portion, and said bore in said hinge arm and said joint-adjusting screw having coincident axes which are inclined with respect to a plane which extends perpendicular to said mounting plane and parallel to said support directions of said bearing means, such that said conical surface and said truncated conical surface contact opposite of said surfaces defining said T-shaped recess, and said enlarged head portion snugly fits within said recess at all relative positions of said joint-adjusting screw with respect to said hinge arm.

4,176,423

CARRYING HANDLE FOR CARRIER BOXES OR LIKE CONTAINERS

Bertil V. Wigemark, Goteborg, Sweden, assignor to Bertil Wigemark AB, Sweden

Continuation-in-part of Ser. No. 725,267, Sep. 21, 1976, abandoned. This application Jan. 13, 1978, Ser. No. 869,172
Claims priority, application Sweden, Sep. 23, 1975, 7510638
Int. Cl.[2] B65D *25/28*
U.S. Cl. 16—125 **4 Claims**



1. A handle unit for ready attachment to a container having in one side two parallel spaced-apart slots, said handle unit comprising a one-piece molding of flexible resilient plastic material having an elongate central grip portion, two like integral flexible flat band-like strap portions extending from opposite ends of said central grip portion, and an elongate locking plate at the outer end of each of said strap portions, each of said locking plates having a thicker midportion which is the same width as the respective strap portion and is integrally joined thereto and like integral inner and outer wing portions extending in opposite directions from said midportion, said wing portions having flat upper faces and rounded tips and being of decreasing width and thickness proceeding from said midportion to said tips, said strap portions having a length greater than said inner wing portions, and said upper faces of said inner wing portions of said locking plates in relaxed condition of said handle unit unattached to a container, as viewed in side elevation, being inclined at an angle of 20° to 50° to the adjacent strap portion and said upper faces of said outer wing portion being inclined to said strap portion at an angle of approximately 160° to 130° but with the sum of said angles of said upper faces of said inner and outer wing portions to said strap portion being slightly less than 180°, whereby said handle unit is attachable to said container automatically by inserting flat bars in the acute angles between said strap portions and said inclined inner wing portions of the respective locking plates, rotating said flat bars to direct said locking plates toward said slots in the container side and bring said inner wing portions close to said strap portions, moving said flat bars toward said container to insert said locking plates and adjacent strap portions through said slots in said container side, and withdrawing said flat bars, whereupon said locking plates resiliently return to their inclined positions relative to said strap portions, whereby said locking plates are approximately parallel to said container side with said strap portions inclined toward one another, and thereupon exerting tension on said strap portions to bring both said inner and outer wing portions of said locking plates uniformly against the inner face of said container side on opposite sides of said slots so as to distribute the load imposed by said locking plates on said container side.

4,176,424

HINGE CASING

Erich Rock, Hochst, and Bernhard Mages, Dornbirn, both of Austria, assignors to Julius Blum Gesellschaft m.b.H., Hochst, Austria

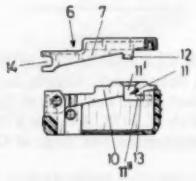
Filed Jan. 30, 1978, Ser. No. 873,536
Claims priority, application Austria, Feb. 9, 1977, 829/77
Int. Cl.[2] E05D *11/00*
U.S. Cl. 16—148 **2 Claims**

1. A hinge casing adapted to be recessed in an article of furniture and to be connected to hinge links of a hinge, said hinge casing comprising:

an integral single dowel member formed of a plastic mate-

rial, said dowel member adapted to be inserted into a bore in an article of furniture, said dowel member having an exterior surface having clamping ribs, said dowel member having formed therein a recess defined by a pair of spaced internal walls, each said wall having therein an L-shaped groove having one arm opening onto the outer edge of the respective said wall;

hinge axle means, extending into said dowel member in a direction substantially transverse to said walls, for connecting hinge links of a hinge to said dowel member, whereby when the hinge is closed the hinge links are positioned in said recess;



an integral single cover member formed of a metal material, said cover member including a pair of spaced inwardly extending flanges, each said flange having adjacent a first end thereof a projection, and each said flange having formed in a second end thereof an end recess; and

said cover member being mounted on said dowel member with said flanges projecting into said recess and contacting said outer edges of respective said walls, with said projections extending into respective said grooves, and with said hinge axle means fitting in said end recesses, with said dowel member and said cover member being free of any other interconnecting structure.

4,176,425

DEVICE FOR SUPPORTING TEXTILE FIBER BALES DURING BALE BREAKING

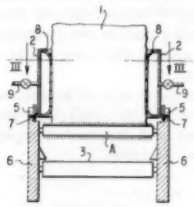
Hermann Trützschler, Mönchen-Gladbach, Fed. Rep. of Germany, assignor to Trützschler GmbH & Co. KG, Mönchen-Gladbach, Fed. Rep. of Germany

Filed Feb. 8, 1978, Ser. No. 876,149

Claims priority, application Fed. Rep. of Germany, Feb. 11, 1977, 2705688

Int. Cl.² D01G *7/06*

U.S. Cl. 19—81 **10 Claims**



1. In a bale breaker machine including breaker means on which a textile fiber bale is positioned for being opened at its underside, a guiding wall pair formed of two substantially vertically oriented bale guiding walls disposed above the breaker means and spaced from one another to accommodate the textile fiber bale therebetween; the improvement comprising

(a) a flexible sheet member bounding a sealed chamber and carried by at least one bale guiding wall at a face thereof oriented to the other bale guiding wall of the guiding wall pair;

(b) means for introducing a pressurized medium into said chamber for inflating said flexible sheet member for moving at least one part thereof away from the associated bale guiding wall and for urging said part into a face-to-face engagement with a side of the textile fiber bale positioned between the bale guiding walls of the guiding wall pair; and

(c) pressing means for resiliently urging said one part of said flexible sheet member towards said face opposing the force of the pressurized medium in said chamber.

4,176,426

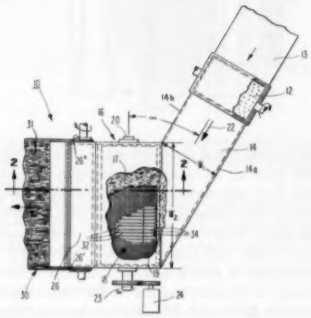
WEB FORMING APPARATUS EMPLOYING INTERMEDIATE WEB FORMING AND SPREADING SECTION

Rudolf Neuenschwander, Swarthmore, Pa., assignor to Scott Paper Company, Philadelphia, Pa.

Filed Aug. 2, 1978, Ser. No. 930,174

Int. Cl.² D04H *1/00*

U.S. Cl. 19—306 **4 Claims**



1. A web forming apparatus including:

a first conveying duct through which a fluid-entrained stream of fibers is adapted to move from an upstream end to a downstream end thereof;

an intermediate rotatable spreading roll obliquely oriented to the first conveying duct and intercepting the downstream end thereof between laterally spaced-apart duct sidewalls, said roll including a foraminous member having an outer surface for receiving the fluid-entrained fibers thereon and passing the fluid therethrough, said foraminous outer surface having a lateral dimension between the duct sidewalls that is greater than the width of the duct at its open downstream end, as measured between the duct sidewalls in a direction generally normal to the direction of fiber flow;

a second conveying duct having an upstream end spaced from the downstream end of the first conveying duct and being intercepted by the outer surface of the spreading roll; and

means for establishing a pressure differential across the apparatus to aid in initially depositing the fibers on the outer periphery of the intermediate spreading roll and relaunching the fibers into the second conveying duct adjacent the upstream end thereof.

4,176,427

WEB FORMING APPARATUS EMPLOYING SPREADING SECTION

Rudolf Neuenschwander, Swarthmore, Pa., assignor to Scott Paper Company, Philadelphia, Pa.

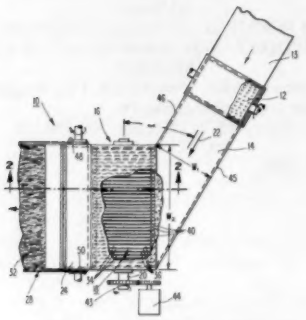
Filed Aug. 2, 1978, Ser. No. 930,175

Int. Cl.² D04H *1/00*

U.S. Cl. 19—306 **6 Claims**

1. An apparatus for increasing the width of a fluid-entrained stream of fibers, said apparatus comprising: a conveying duct

including laterally spaced-apart sidewalls, said duct having an upstream end for receiving the fluid-entrained stream of fibers and a downstream end toward which the stream is directed; a rotatable spreading roll having a plurality of axially spaced-apart disks providing flow-directing channels between them and intercepting the downstream end of the duct between the laterally spaced-apart sidewalls, the rotational axis of the spreading roll being obliquely oriented to the direction of flow through the conveying duct to present an axial dimension



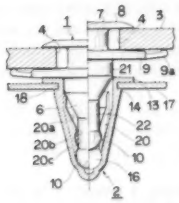
between the spaced-apart duct sidewalls that is greater than the width of the duct at its open downstream end, as measured between said duct sidewalls in a direction generally normal to the direction of fiber flow through the duct; whereby the flow of fluid-entrained fibers is received in the channels over a greater width than the duct width, is diverted by moving through the channels, and is thereafter released from the channels as a stream of fluid-entrained fibers wider than the stream in the conveying duct; and drive means for rotating the spreading roll.

4,176,428

PANEL FASTENER

Shigeru Kimura, Kamakura, Japan, assignor to Nifco, Inc., Tokyo, Japan

Filed Feb. 6, 1978, Ser. No. 875,275
Claims priority, application Japan, Feb. 5, 1977, 52-11223
Int. Cl.² A44B *21/00*
U.S. Cl. 24—73 P **8 Claims**



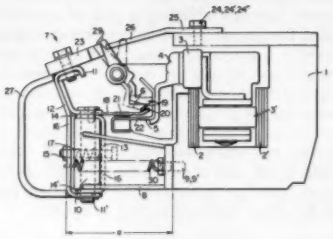
1. A plastic fixing device for mounting a decorative panel on an apertured supportng panel comprising a male member adapted to be fastened to said decorative panel and a female member adapted to be attached to said apertured supporting panel, which device is characterized by the fact that said male member is provided with head means for fastening said male member to the decorative panel, said male member further including a shaft extending from the said head means and terminating in a bulbous engaging portion, said female member including a hollow barrel open at one end, a fitting flange extending outwardly from the periphery of the opening at one end of said barrel and shoulder means protruding from the outer surface of the barrel so that the female member can be attached to said supporting panel by inserting said barrel through a hole perforated in the supporting panel, said female member barrel is further provided inside the hollow interior thereof with a first spherical cavity and a second spherical cavity co-axially spaced so that when the shaft of said male member is telescopically received through the end opening into the hollow barrel interior of the female member and the male and female members are brought into temporary engagement by driving said shaft to a first position of insertion by seating the bulbous engaging portion in said first spherical cavity, the two members are brought into full engagement by axially driving the shaft to a second position of insertion and thereby seating the bulbous engaging portion in said second spherical cavity, whereby the decorative panel is fastened to the supporting panel.

4,176,429

APPARATUS FOR CLEANING CLAMPING SURFACES

Hans Rottensteiner, Schwarzach, Austria, assignor to Lindauer Dornier Gesellschaft mbH, Fed. Rep. of Germany

Filed Feb. 2, 1978, Ser. No. 874,698
Claims priority, application Fed. Rep. of Germany, Mar. 22, 1977, 2712477
Int. Cl.² D06C *3/02*
U.S. Cl. 26—93 **6 Claims**



1. An apparatus for cleaning the clamping surfaces of tenter hook or clip tables and small flaps of tenter hooks or clips during the operation of a tenter hook or clip chain, which comprises a carrier member secured to a tenter hook or clip chain/guide path,

an axle vertically positioned with respect to said path,

a brush mounting unit supported by said axle and having upwardly and downwardly directed rows of brushes,

said brush mounting unit being pivotal on said axle and flexibly connected with the carrier member by resilient means and, in a position of rest thereof, being positioned so as to be pivoted away from the tenter hook or clip,

said brush mounting unit, in the operating position thereof, being pivoted against the tenter hooks or clips in the open position thereof,

and whereby the upper row of brushes scrapes and brushes clamping surfaces of the small flaps, and the lower row of brushes scrapes and brushes clamping surfaces of the tenter hook or clip tables.

4,176,430

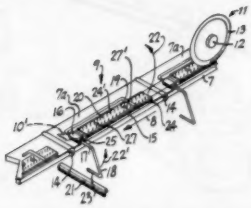
SELVAGE STRIP LIFTING DEVICE

Harvey G. Anderson, 1264 Dogwood Dr., Bridgewater, N.J. 08807, and Karl E. Pannaci, 27 Raplh St., Highlands, N.J. 07732

Filed Apr. 13, 1978, Ser. No. 895,995
Int. Cl.² D06C *3/10*
U.S. Cl. 26—96 **3 Claims**

1. A selvage lifting device comprising in combination, for mounting on a fabric edge-carrying traveling-belt device including consecutive links adapted for moving fabric selvage past and into trimming contact with a selvage strip-producing cutting blade while a fabric edge is pin-mounted onto upwardly-extending pins of the consecutive links, and for lifting selvage residual strip from the pins of each link which includes an

elongated base element having a free side-edge extending along a longitudinal axis of the base element, and the base element including a hinge means mounting pivotably a lever element having a handle element connected to the lever element adapted to impart pivotal motion thereto, with the lever element being connected to said handle element and mounted on said hinge means such that when pressure is applied to said handle element said lever element pivots rotatably around a hinge axis of the hinge means, the improvement comprising said lever element being mounted by said hinge means around



said axis thereof such that the lever element pivots from an upper surface of the base element, with the lever element extending in a direction along said longitudinal axis and extending through said hinge axis to a point beyond said free edge, which hinge axis extends substantially transversely to said longitudinal axis, and the handle element extending beside said free edge from below a level of said base element to the point said, and the handle element being positioned to pivot in a direction extending along said longitudinal axis when pressure is applied thereto.

4,176,431

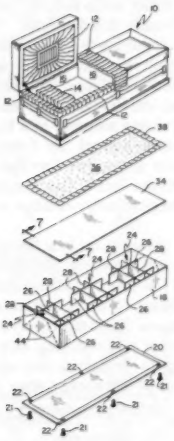
MULTI-ELEMENT CASKET

Ambrose S. Havey, III, 12 Grove Mews, Chappaqua, N.Y. 10514

Continuation-in-part of Ser. No. 847,403, Oct. 31, 1977, which is a continuation-in-part of Ser. No. 718,114, Aug. 27, 1976, Pat. No. 4,063,337. This application May 18, 1978, Ser. No. 906,931

Int. Cl.[2] A61G *17/00*

U.S. Cl. 27—2 **19 Claims**



1. A multi-element casket, comprising:

(a) an outer casket shell having a top and sidewalls;

(b) a foldable container bottom, having sidewalls and a bottom, configured and dimensioned to be disposed within said outer casket shell with the sidewalls of said outer casket shell extending around said container bottom;

(c) support means for supporting said container bottom within said outer casket shell;

(d) sheet means configured, dimensioned and positioned to lie above the bottom of said container bottom and adjacent to sidewalls of said container bottom; and

(e) separator means separate from said sheet means for supporting said sheet means in spaced relationship to the bottom of the said container bottom.

4,176,432

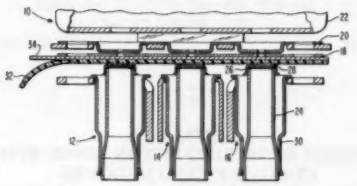
METHOD FOR ESTABLISHING UNIFORM CATHODE-TO-GRID SPACING IN AN ELECTRON GUN

Harry E. McCandless, Hopewell, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 13, 1978, Ser. No. 969,158

Int. Cl.[2] H01J *9/18*

U.S. Cl. 29—25.16 **3 Claims**



1. A method for establishing uniform cathode-to-grid spacing in an electron gun including a plurality of cathodes, said method comprising the steps of:

inserting a substantially nondeformable strip and a confronting substantially deformable strip on the cathode side of a grid with the nondeformable strip facing the grid, the sum of the thicknesses of the two strips being the desired cathode-to-grid spacing,

moving the cathodes until the cathodes press against the deformable strip,

affixing the cathodes relative to the grid,

first withdrawing the nondeformable strip and thereafter withdrawing the deformable strip.

4,176,433

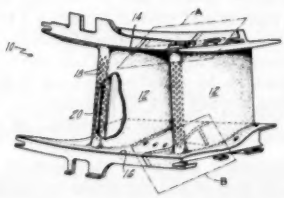
METHOD OF REMANUFACTURING TURBINE VANE CLUSTERS FOR GAS TURBINE ENGINES

Jack W. Lee, Palm Beach Gardens, and Charles A. Voehringer, Boynton Beach, both of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Jun. 29, 1978, Ser. No. 920,582

Int. Cl.[2] B23P *15/04*

U.S. Cl. 29—156.8 B **5 Claims**



1. A method for remanufacturing turbine vane clusters of the type having two or more coated vanes extending between a common inner platform and a common outer platform, comprising the steps of:

inspecting damaged vane clusters and selecting complementary vanes and contiguous platforms for combination into a reconstructed cluster;

stripping the coating materials from the selected vanes and from the portions of the platforms contiguous thereto;

relieving residual stresses in the entire vane clusters in which

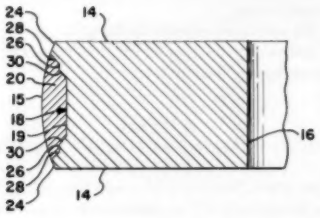
the selected vanes are contained prior to the step of separating the selected vanes from the clusters;
separating the selected vanes and the portions of the platforms contiguous thereto from the vane clusters after the step of relieving stresses from the vane clusters;
machining bond faying surfaces on the platforms of the complementary vanes selected for combination;
cleaning the machined faying surfaces;
bonding the complementary vanes at the faying surfaces to form a reconstructed vane cluster;
solution heat treating the reconstructed vane cluster;
applying corrosion resistant coating to surfaces of the vane cluster which are to be exposed to hot working medium gases;
precipitation hardening the coated vane cluster.

4,176,434

METHOD OF MAKING PISTON RINGS WITH CHROME-FILLED GROOVES

John E. Cromwell; Nicholas Herbert, both of Baltimore, and Glenn F. Hyde, Timonium, all of Md., assignors to Koppers Company, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 760,637, Jan. 19, 1977, abandoned, which is a continuation-in-part of Ser. No. 691,501, Jun. 1, 1976, abandoned, which is a continuation-in-part of Ser. No. 480,164, Jun. 19, 1974, abandoned. This application May 19, 1978, Ser. No. 907,375
Int. Cl.[2] B23P *15/06*
U.S. Cl. 29—156.63 **4 Claims**



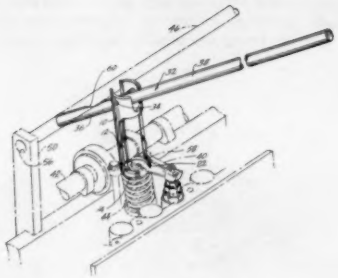
1. A method of making piston rings comprising the steps of:
(a) forming annular grooves in the outer periphery of a plurality of piston ring blanks to form axially-spaced outer bearing shoulders between said grooves and side faces of said rings, each of said grooves including a bottom land and at least one pair of axially-spaced, radially intermediate lands connected to said bottom land and to said outer bearing shoulders by radially outwardly diverging side walls forming stepped sides for said groove;
(b) stacking a plurality of said ring blanks on a rotatable arbor;
(c) electro-depositing a layer of chromium on the outer peripheral surfaces of said ring blanks on said arbor to fill said grooves and cover said bearing shoulders, said electro-depositing resulting in a chromium surface having shallow depressions formed opposite the intermediate and bottom lands, and
(d) removing an outer portion of said chromium layer to expose said bearing shoulders to form an axially convex outer face on said ring, whereby the stepped sides of the intermediate land minimizes the amount of electro-deposited chromium material required to provide said axially convex outer face on said ring by decreasing the depth of the depressions.

4,176,435

APPARATUS FOR REMOVING ROCKER ARMS

John H. Castoe, 10234 McVine St., Sunland, Calif. 91040

Filed Jan. 24, 1978, Ser. No. 871,816
Int. Cl.[2] B23P *19/04*
U.S. Cl. 29—220 **8 Claims**



1. Apparatus for removing a rocker arm of a cam shaft-activated valve mechanism in an engine cylinder head, in which a valve spring is biased into engagement with the rocker arm to urge the rocker arm toward the cam shaft, the apparatus comprising:
an elongated force-applying member having a working face at a first end thereof and a second end spaced longitudinally from the first end;
an elongated leverage arm having a first portion and a second portion;
means pivoting an intermediate portion of the leverage arm about a transverse axis of the force-applying member adjacent the second end thereof, the first portion of the leverage arm projecting away from one side of the transverse axis, the second portion of the leverage arm projecting away from an opposite side of the transverse axis;
an elongated force-receiving member;
at least a pair of support brackets each having means for being releasably secured in a fixed upright position on an engine cylinder head, each bracket being movable independently of the other bracket; and
means for slidably securing the force-receiving member to each bracket, each bracket being movable along the length of the force-receiving member independently of the other bracket, the brackets providing means for holding the force-receiving member in a fixed position spaced from the transverse axis of the force-applying member when the brackets are secured to the spaced apart locations on the cylinder head, the force-receiving member being slidable longitudinally relative to the fixed support brackets;
the first portion of the leverage arm being releasably engageable with the force-receiving member so that fitting the working face of the force-applying member over a valve spring and applying force to the second portion of the leverage arm causes the force-receiving member to resist such force to move said working face against the bias of the valve spring to compress the spring sufficiently to facilitate removal of the rocker arm.

4,176,436

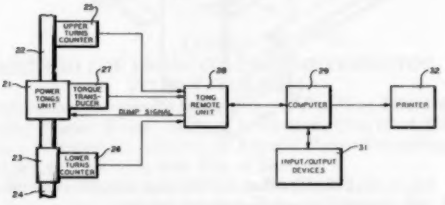
METHOD AND APPARATUS FOR COUNTING TURNS WHEN MAKING THREADED JOINTS

Russell L. McCombs, San Antonio, and James V. Motsinger, Austin, both of Tex., assignors to Baker International Corporation, Orange, Calif.

Filed Sep. 12, 1978, Ser. No. 941,894
Int. Cl.[2] B25B *23/14*
U.S. Cl. 29—240 **8 Claims**

1. In an apparatus for making threaded joints from a pair of threaded members including means for rotating one of the

members with respect to the other member, means for generating a signal representing the actual torque applied to the one member by the means for rotating, means for generating a signal representing the average turns made by the one member and means responsive to the actual torque and the average turns signals for indicating the actual torque and the average turns values, the average turns signal generating means comprising: means responsive to the actual torque signal for generating a first signal when the value of the actual torque is greater than the value of a predetermined reference torque and for



generating a second signal when the value of the actual torque is less than said reference torque value; means responsive to the rotation of the one member for generating a signal representing actual turns made by the one member; means responsive to said actual turns signal for accumulating a count total of the actual turns, said accumulating means being responsive to said first signal for incrementing said count total in response to said actual turns signal and being responsive to said second signal for decrementing said count total in response to said actual turns signal; and means responsive to said count total for generating the average turns signal.

4,176,437

METHOD OF REPAIRING A DEFECTIVE COATED WORKPIECE

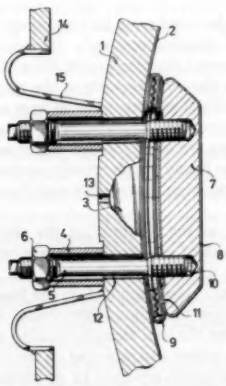
Manfred Scholz, Hürth-Hermülheim; Lothar Strie, Bornheim-Merten, and Karl-Heinz Stendenbach, Erftstadt, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Apr. 19, 1978, Ser. No. 897,674

Claims priority, application Fed. Rep. of Germany, Apr. 23, 1977, 2718238

Int. Cl.[2] B23P *7/00*; B32B *35/00*

U.S. Cl. 29—402.12 **5 Claims**



1. A method of repairing a defective coating area on the interior enamel-coated wall of a container comprising the steps of covering the defective coating area with a smooth enamel-coated plate having a greater area than the defective area in a manner which overlaps sound enamel coating, disposing a sealing medium between the outer periphery of the plate and the sound coating surrounding the defective area within the confines of the plate, extending fasteners through the wall of the container into a side of the plate disposed adjacent the interior wall without penetrating the enamel coating on the opposite side of the plate, and firmly securing the fasteners against the outer wall of the container in a manner which urges the plate and sealing medium into firm sealing contact against the inner wall of the container whereby a smooth enamel coating is restored to the interior wall of the container.

4,176,438

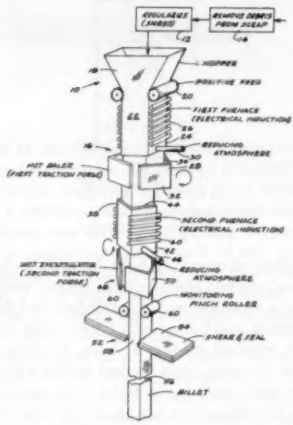
METHOD FOR PRODUCING INTEGRALLY SEALED BILLETS FROM SCRAP METAL WITHOUT FULLY REMELTING THE METAL

A. Jack Warden, 945 Ravine Dr., Youngstown, Ohio 44505

Filed Jul. 22, 1977, Ser. No. 818,231

Int. Cl.[2] B22F *3/16*

U.S. Cl. 29—403.1 **21 Claims**



1. A method for producing an integrally sealed, but not fully dense billet from scrap metal fragments without fully remelting the scrap metal thereof, comprising:

loading into a hopper a supply of scrap metal particles having an average particle size that is larger than powder at a sufficient rate to continuously provide a columnar supply of scrap metal particles issuing from the hopper, with an average of about 15–25 percent full density;

while laterally confining an increment of said column in the lumen of a first furnace stationed to be fed by the hopper with the laterally exterior surface of column in extensive guiding contact with an inner peripheral sidewall surface which defines said lumen, heating the increment therein in a reducing atmosphere;

squeezing an increment of the column laterally inwardly and pulling the heated column axially forwardly at a first squeezing and pulling site axially downstream of the first furnace;

said heating, squeezing and pulling, in combination, continuously providing a column with an average of about 40–50 percent full density and which is sufficiently consolidated to be laterally self-supporting;

surrounding an increment of said column, axially downstream of said first squeezing and pulling site with the lumen of a second furnace and heating this increment therein in a reducing atmosphere;

squeezing an increment of the column laterally inwardly and pulling the heated column axially forwardly at a second squeezing and pulling site axially downstream of the second furnace;

the last-described heating, squeezing and pulling, in combi-

nation, continuously providing a column with an average of about 70–99 percent full density, including a perimetrically complete laterally outer peripheral surface region which is substantially fully dense to a depth of at least one-sixteenth inch as an integral seal therefor.

4,176,439

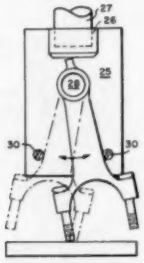
TOOL FOR REMOVING AND INSERTING BOLTS IN CONNECTING RODS

Adolf Jarmann, 23426 Summit Rd., Los Gatos, Calif. 95030

Division of Ser. No. 860,864, Dec. 15, 1977, Pat. No. 4,138,780. This application Sep. 20, 1978, Ser. No. 943,768

Int. Cl.[2] B23P *19/02*

U.S. Cl. 29—427 **5 Claims**



1. The method of removing bolts from the bolt hole openings in a connecting rod having a wrist pin end with an opening for receiving a wrist pin and a crankshaft end formed to fit over a crankshaft and by use of a power press having a ram which can be actuated towards a platen, the steps comprising:

attaching to the press ram a support having a planar member with one end adapted to be fixed to the ram and including a pintle extending from the planar member in a direction normal to the direction of travel of the ram;

placing the connecting rod on the support with the wrist pin opening over the pintle and the crankcase end extending towards the platen; and

activating the ram to bring the extending bolts into contact with the platen to thereby press the bolts from the connecting rod holes.

4,176,440

SAFE, AND METHOD AND APPARATUS FOR BUILDING IT

Robert J. Lichter, 15571 Placid Cir., Huntington Beach, Calif. 92647

Continuation-in-part of Ser. No. 758,587, Jan. 12, 1977, abandoned. This application Mar. 27, 1978, Ser. No. 890,489

Int. Cl.[2] E05G *1/00*

U.S. Cl. 29—458 **16 Claims**

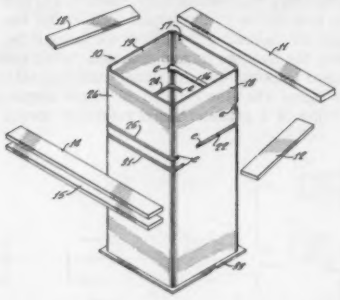
8. A method of constructing a safe, which comprises:

(a) providing exterior and interior forms for concrete and which are spaced from each other sufficiently far that a thick-walled concrete container for valuables will result from pouring of concrete between said forms, the container having an access region into the valuables cavity,

(b) extending a strong, burglar-resistant element into an opening in said interior form in proximity to said access region,

(c) pouring concrete between said forms to embed in concrete portions of said strong element which are not in said opening, and

(d) providing a door in said access region and associated with the part of said strong element which is in said open-



ing, in such manner that said one part aids in maintaining said door closed and resistant to burglars.

4,176,441

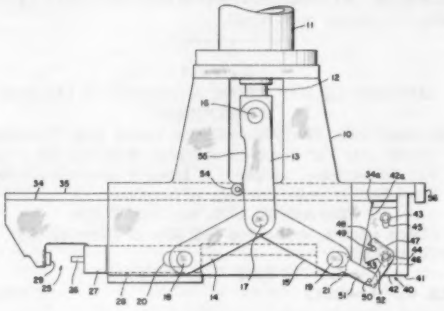
LOCKING JOINT MACHINE

Otto P. Hafner, 1321 Paddock Way, Cherry Hill, N.J. 08034

Continuation-in-part of Ser. No. 764,470, Jan. 31, 1977. This application Dec. 30, 1977, Ser. No. 866,038

Int. Cl.[2] B23P *19/00*

U.S. Cl. 29—566.1 **12 Claims**



1. A machine for producing locking joints in hard-to-reach locations which require not only joint-producing relative movements between a piercing punch, die and flattening punch which constitute the tool elements of the machine, but which also require additional movements of at least some of these tool elements to position them operatively relative to the locations at which the joints are to be formed, said machine comprising

a main machine frame which remains stationary during both the joint-producing movements and the additional movements,

a plurality of means for holding the three different tool elements, each of said holding means being reciprocably mounted on the stationary frame,

positioning means also mounted on the frame and including means movable to reciprocably change the relative positions between the tool element holding means, and

toggle linkage means also mounted on the frame and adapted to be reciprocably actuated to go through toggle alternately in opposite directions,

a first link of the linkage means imparting the joint-producing reciprocating movement to one of the tool element holding means, and a second link of the linkage means imparting the joint-producing and additional movements to the other tool element holding means, including the

movements for changing the relative positions between tool element holding means.

4,176,442

METHOD FOR PRODUCING A SEMICONDUCTOR FIXED VALUE ROM

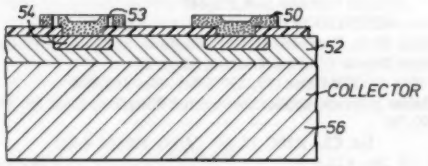
Erich Bischoff, Langenau; Jurgen Dangel, Ulm; Hans Schussler, Ulm; Thomas Ricker, Ulm, and Erich Stein, Ulm, all of Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltung-G.m.b.H., Frankfurt, Fed. Rep. of Germany

Filed Oct. 6, 1976, Ser. No. 730,255

Claims priority, application Fed. Rep. of Germany, Oct. 8, 1975, 2545047

Int. Cl.² H01L *21/72*

U.S. Cl. 29—571 **7 Claims**



1. In a method for producing a fixed value memory in the form of a programmable, monolithically integrated circuit, wherein the fixed information is introduced into a semiconductor memory as a binary coded bit pattern in process stages integrated into or following the conventional production sequence for semiconductor circuits including the direct transfer of occupation of the memory cells as prepared by software, with the elimination of masks comprising the steps of: providing a semiconductor memory which was produced according to the MOS technique and including MOS transistor memory cells arranged to form a matrix and conductor paths substantially connecting the gate terminals of said transistors in rows arranged on the surface of said memory; producing a masking layer corresponding to the desired coded bit pattern on said surface of said memory by applying a layer of radiation sensitive lacquer (electron resist) to said surface of said memory and deflecting a focused electron beam according to a given bit pattern under the control of a computer to illuminate said lacquer layer at selected points to render the lacquer at the illuminated points soluble; and thereafter selectively processing said memory to cause the memory cells of the memory circuit below the masking layer to receive the stored value by removing the portions of the conductor paths disposed below the soluble portions of the lacquer in an etching process; the improvement wherein the potential of the gate terminals of the memory transistors is used as the information carrier and wherein said illuminated points are such as to cause selected gate terminals to be disconnected from the associated conductor during said etching process.

3. A method as defined in claim 1 wherein said step of selectively processing further includes: additionally removing the metallization from the gate terminals of the transistors which are disconnected from the associated conductors according to the desired occupation; and thereafter implanting ions in these gate regions so as to set a stable switching state for the associated MOS transistor memory cell disposed therebelow.

4,176,443

METHOD OF CONNECTING SEMICONDUCTOR STRUCTURE TO EXTERNAL CIRCUITS

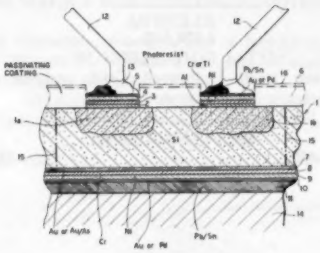
Giulio Iannuzzi; Carlo C. deMartiis, both of Milan; Vittorio Del Bo, Monza, and Luciano Gandolfi, Corsico, all of Italy, assignors to SGS-ATES Componenti Elettronici S.p.A., Agrate Brianza, Italy

Continuation-in-part of Ser. No. 884,498, Mar. 8, 1978, abandoned. This application Nov. 3, 1978, Ser. No. 957,331

Claims priority, application Italy, Mar. 8, 1977, 21021 A/77

Int. Cl.² B01J *17/00*

U.S. Cl. 29—589 **7 Claims**



1. A method of establishing connections between a crystalline semiconductor structure and external circuitry, said semiconductor structure including a silicon body having a front surface with a plurality of disjointed contact areas and an essentially uniform rear surface, comprising the steps of:

building up a conductive pad on each of said contact areas by successively depositing thereon a base front layer of aluminum, a first intermediate front layer of a metal selected from the group which consists of chromium and titanium, a second intermediate front layer of nickel, and an outer front layer of a noble metal selected from the group which consists of gold and palladium;

successively coating said rear surface with a base rear layer of a conductive materials selected from the group which consists of gold and gold/arsenic alloys, a first intermediate rear layer of chromium, a second intermediate rear layer of nickel and an outer rear layer of said noble metal;

depositing a low-melting metallic bonding agent on each of said outer layers; and

simultaneously soldering said outer layers to respective external conductors by melting said bonding agent in a furnace.

4,176,444

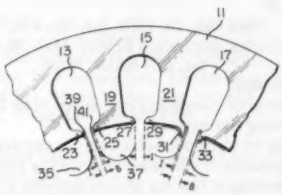
METHOD AND APPARATUS FOR ASSEMBLING DYNAMOELECTRIC MACHINE STATORS

Robert G. Walker, Ossian, Ind., assignor to Industra Products, Inc., Fort Wayne, Ind.

Filed Sep. 19, 1977, Ser. No. 834,106

Int. Cl.² H02K *15/06*

U.S. Cl. 29—596 **12 Claims**



1. A method of making a stator for a dynamoelectric machine having a stator core with a centrally disposed axially

extending generally cylindrical bore, a plurality of axially elongated slots communicating with the bore and a like plurality of stator teeth separating adjacent slots, adjacent tips of the stator teeth forming a gap where the slots communicate with the bore and comprising the steps of:

enlarging the gap between at least certain adjacent pairs of teeth throughout substantially the entire axial extent thereof;

assembling stator windings in selected slots including slots the associated gap of which has been enlarged; and

reducing the gap between the at least certain adjacent pairs of teeth throughout substantially the entire axial extent thereof.

4,176,445

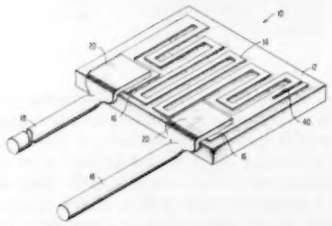
METAL FOIL RESISTOR

Benjamin Solow, North Hollywood, Calif., assignor to Angstrohm Precision, Inc., Hagerstown, Md.

Filed Jun. 3, 1977, Ser. No. 803,291

Int. Cl.[2] H01C *7/00*

U.S. Cl. 29—620 **19 Claims**



1. A method of making a metal foil electrical device comprising the steps of:

(a) affixing a thin, conductive metal foil to an insulative substrate;

(b) forming a masking material on said conductive metal foil in the shape of a desired electrical circuit having a plurality of terminals;

(c) subjecting the device to a first acid etching treatment to remove all of the conductive metal foil except that covered by the masking material

(d) removing the masking material from the conductive metal foil;

(e) adjusting the value of the device by subjecting it to a second acid etching treatment which reduces the thickness of the conductive foil forming the electrical circuit;

(f) attaching a connecting lead to each of the terminals and

(g) encapsulating the electrical device such that the connecting leads protrude from said encapsulation.

4,176,446

ASSEMBLY PROCESS OF ELECTRODES IN AN INSULATING MATERIAL

Eugéne M. Quéré, Brunoy, and Pierre M. Le Rolland, Le Plessis Trevise, both of France, assignors to ITT Industries, Inc., New York, N.Y.

Filed Feb. 10, 1978, Ser. No. 876,770

Claims priority, application France, Mar. 30, 1977, 77 09494

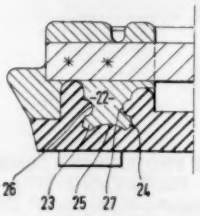
Int. Cl.[2] H01H *11/06*

U.S. Cl. 29—622 **6 Claims**

1. A process of assembling electrodes in an insulating material comprising the steps of:

providing an electrode with cuts for cooperating with the configuration of a housing made in the insulating material for receiving a first set of cuts defining a lug in the electrode, said lug comprising a second set of cuts defining between them two fingers,

providing a housing in the insulating material having a bottom presenting two projections spaced from each other such that the electrode lug fingers may house therein, the width and height of said projections being determined by the dimensions of the first set of cuts which said projections cooperate with when the electrode is positioned within the housing of the insulating material, and



applying a force to introduce the electrode in said housing until said fingers abut the housing bottom, until the free end of the projection abuts the bottom of the first set of cuts, with the electrode fingers then penetrating the insulating material by deformation and deforming the insulating material into the second sets of cuts.

4,176,447

METHOD FOR MAKING AN ELECTRODE

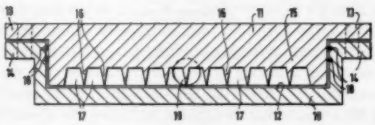
Michael P. J. Brennan, Helsby, England, assignor to Chloride Silent Power Limited, London, England

Filed Dec. 19, 1977, Ser. No. 861,924

Claims priority, application United Kingdom, Dec. 20, 1976, 53197/76

Int. Cl.[2] B29C *15/00, 24/00;* H01M *4/00*

U.S. Cl. 29—623.5 **19 Claims**



1. In the manufacture of a sodium sulphur cell, a method of making an annular cathodic electrode structure having a porous matrix of electronically-conductive material impregnated with an electro-chemical reactant material comprising the steps of enclosing a sheet of compressible matrix material in a heated mould formed so as to compress the matrix material over its whole area and to effect greater compression of the material in pre-selected regions arranged so that the matrix material is formed into a planar assembly of shaped segments, admitting said reactant material in a molten state into said mould to impregnate the matrix segments and cooling the assembly to solidify the reactant material whereby substantially rigid shaped segments of impregnated matrix material are produced, the mould being shaped to leave the segments joined together by thin webs of compressed material.

4,176,448

AUTOPIN MACHINE

Irwin Zahn, New York, N.Y., and Heinrich F. Meyer, Ormond Beach, Fla., assignors to General Staple Company, Inc., New York, N.Y.

Division of Ser. No. 773,274, Mar. 1, 1977, abandoned. This application Sep. 14, 1978, Ser. No. 942,332

Int. Cl.[2] H05K *3/30*

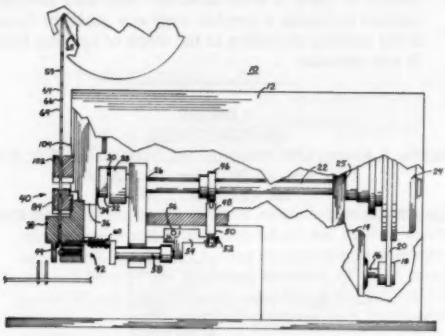
U.S. Cl. 29—626 **2 Claims**

1. A method for inserting terminal pins into a workpiece; said method comprising:

providing a supply strip of integrally connected preformed terminal pins connected in longitudinally extending end-

to-end relationship; wherein said preformed terminal pins terminate in pointed end portions, integrally connected adjacent pointed end portions of adjacent pins forming notched regions in said supply strip;

sequentially advancing said supply strip toward said workpiece;



shearing the leading one of said terminal pins from the remainder of said supply strip at said notched regions;

driving said leading one of said pins into said workpiece; and

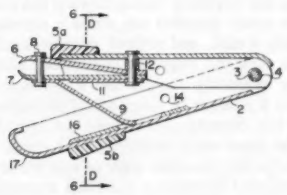
further including the step of holding said leading one of said terminal pins by a holding means after it has been sheared and continuing to hold said pin by said holding means while it is being driven into said workpiece.

4,176,449

GRIP-OPERATED NAIL CLIPPER

George K. C. Lee, and Wanda M. Lee, both of 3843 Old Pali Rd., Honolulu, Hi. 96817

Filed Mar. 22, 1978, Ser. No. 888,916
Int. Cl.[2] A45D *29/02*
U.S. Cl. 30—28 **3 Claims**



1. The invention of a new and improved Grip-Operated Finger and Toe Nail Clipper Unit comprising of a U-channeled Top Clamp Bar Unit hinged at one end to nestle into a second larger U-channeled Bottom Clamp Bar, with finger pads on the exterior face of both Top and Bottom Clamp Bars at the open end away from the hinge,

and with a common Nail Clipper Unit of prior art consisting of a complete unit of two nipper bars with cutting edges at one end and riveted together at the other end with a rotateable file bar on the exterior face of one nipper bar, a front guide post to align the cutting edges of the nipper bars to meet when same are compressed by a loose actuating lever piece which is notched to seat in and rotate around the front guide post with same actuating lever so devised by prior art that it will lie flat over and covering the file bar when in the closed position or to actuate the cutting edges when in the open angled position,

and with same common Nail Clipper Unit so riveted in the channel of the open end of the Top Clamp Bar so the cutting edges of the nipper bars will protrude beyond the finger pad, and with the bottom nipper bar flush with the bottom edge of the Top Clamp Bar so that the file bar of the Nail Clipper Unit can be rotated 90° outward to function as a file accessory, and with the Nail Clipper Unit held firmly in place when same is inserted and seated under the return edges of the ends of the Top Clamp Bar,

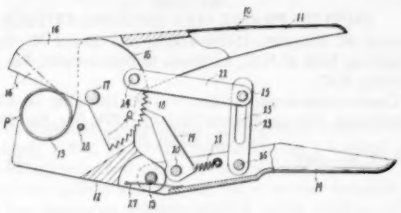
all to form a new unit with new configuration so that the common Nail Clipper Unit can be actuated by a full hand-grip operated set of Top and Bottom Clamp Bars with a firmer grip and more ease and less effort.

4,176,450

CUTTER MAINLY FOR CUTTING SYNTHETIC RESIN ARTICLES

Wasaburo Muromoto, deceased, late of Neyagawa, Japan (by Osamu Muromoto, executor), assignor to Muromoto Iron Works Co., Ltd., Neyagawa, Japan

Filed Jan. 25, 1978, Ser. No. 872,238
Claims priority, application Japan, Jan. 25, 1977, 52-7839[U]
Int. Cl.[2] B26B *13/00*
U.S. Cl. 30—92 **17 Claims**



1. A cutter mainly for cutting synthetic resin articles comprising a main body including a base portion serving as a holder handle and a front half portion serving as a holder portion for holding a workpiece, an operating handle mounted by a pivot on the holder portion and movable toward and away from the holder handle in opposed relation thereto, a cutting blade turnably mounted by a support pin on the holder portion and having a cutting edge in opposed relation to the holder portion for holding the workpiece the cutting blade being formed with ratchet teeth on one side of the support pin opposed to the cutting edge, a pawl pivotally mounted by a pivot pin on the operating handle and engageable with one of the ratchet teeth to provide a ratchet mechanism, and a spring having one end secured to the operating handle and the other end attached to the base end of the pawl for biasing the pawl into engagement with the ratchet toothed portion at all times, said cutter further comprising a first link having one end pivoted to the cutting blade at a position slightly above the ratchet teeth portion thereof and the other end to a second link at one end of said second link; the other end of the second link being pivoted to the base portion of the operating handle, said links moving freely with respect to each other to permit the cutter handles to be opened and closed without interference, said links operating to return the cutter blade from the workpiece after completion of the cutting operation by opening the operating handle.

4,176,451

BLOOD SEGMENT PROCESSOR

John J. McMorrow, 55 Florence Ave., Oyster Bay, N.Y. 11771

Filed Sep. 14, 1978, Ser. No. 942,415
Int. Cl.[2] B26B *17/00*
U.S. Cl. 30—124 **1 Claim**

1. Means to release blood from a segmented plastic tube into a test tube comprising:

a flexible tubular member adapted to fit inside a test tube,

and a spur cutter mounted a predetermined distance from the top in said tubular member,

whereby a segmented plastic tube containing blood may be inserted in said tubular member and pierced by the spur

cutter to punch a hole thereby release the blood into said test tube, without any spillage,

the interior wall of the tubular member being shaped to position the segmented tube so that it is pierced by the spur at a central point on the tubular member.

4,176,452

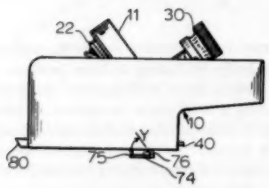
PICTURE FRAME MAT OPENING CUTTER

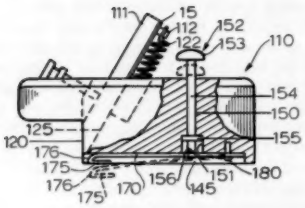
Richard W. Duggins, Hillsborough, and James W. Rodgers, Durham, both of N.C., assignors to Frameworks, Inc., Cedar Grove, N.C.

Continuation-in-part of Ser. No. 861,258, Dec. 16, 1979, abandoned. This application May 25, 1978, Ser. No. 909,673

Int. Cl.[2] B26B *29/00*

U.S. Cl. 30—293 **14 Claims**





1. A picture frame mat opening cutter comprising:

(a) a cutter body adapted for being manually grasped and manipulated to form an opening in a picture frame mat, said cutter body having a flat bottom surface with a horizontal guide slot formed centrally therein and having an angularly disposed guide slot formed in said cutter body;

(b) a blade support bar slidably mounted in said angularly disposed guide slot and providing a blade mounting surface thereon;

(c) a mat opening cutter blade detachably mounted on said blade support bar surface for slidable movement therewith;

(d) spring means mounted within said cutter body and operative on said blade support bar enabling said blade support bar and said blade mounted thereon to be constantly tensioned in a retracted blade direction;

(e) means mounted on said cutter body and adapted to adjustably locate said blade support bar and said blade mounted thereon in a position appropriate to cutting a preselected mat opening; and

(f) an elongated template guide bar movably mounted in said horizontal guide slot, said guide bar having an outwardly angled protrusion at its forward end from which a thin, flat guide vane extends rearwardly from the outer edge thereof to form a hook structure with said protrusion adapted to engage a template edge as a guide for forming a mat opening according to the shape of opening formed in said template.

4,176,453

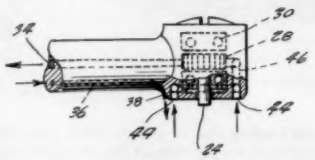
DENTAL DRILL

Sheldon J. Abbott, 1068 Hicksville Rd., Massapequa, N.Y. 11758

Filed Sep. 13, 1976, Ser. No. 722,554

Int. Cl.[2] A61C *1/08*

U.S. Cl. 433—82 **2 Claims**



1. A dental drill comprising a handpiece having a neck portion, a drill head integral with the end of neck portion and including a housing having an integral lower surface formed of unitary construction with the housing, and a removable cap covering the upper end of the housing, a tubular shaft longitudinally extending at least partially through said housing and adapted to receive a burr inserted therein which can then extend through an opening in said lower surface, a turbine transversely positioned in said housing and coupled to said shaft for rotating said tubular shaft thereby rotating the burr, a water conveying tube axially extending through said neck and connecting to conduits positioned proximate to said shaft and terminating in discharge outlets adjacent the lower surface of said housing and angularly facing toward the extending shaft whereby the water supplied can strike a rotating burr to be dispersed into a mist, and a fixed passage axially extending through said neck and transversely crossing said turbine then downwardly extending toward the lower surface where it splits up into a number of longitudinal extending pipes each terminating in a discrete port formed through the lower surface with the ports being equally spaced about the shaft and positioned adjacent the outer edge of said lower surface, said handpiece adapted to connect the fluid conveying tube to a source of water, and to connect said passage to a source of vacuum to aspirate said water mist and air from the vicinity of the burr whereby the water and air aspirated through the discrete ports pass upward through the individual extending pipes and then join together into said fixed passage to transversely cross the turbine thereby operating the turbine.

4,176,454

ULTR..SONIC TOOTH CLEANER

Edward E. Hatter; Richard H. Taylor, both of Irvine, and Richard D. McGunigle, La Habra Heights, all of Calif., assignors to Biosonics International, Ltd., Irvine, Calif.

Filed Apr. 25, 1977, Ser. No. 790,312

Int. Cl.[2] A61C *3/03*

U.S. Cl. 433—119 **3 Claims**

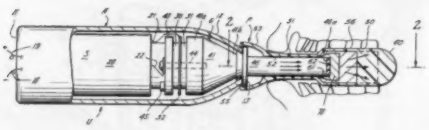
1. An ultrasonic tooth cleaning device comprising:

(a) a hand held housing mounting an ultrasonic energy generator adapted to be positioned outside the mouth;

(b) a power supply connected to said ultrasonic energy generator; and

(c) ultrasonic distributor means driven by said ultrasonic energy generator connected to said housing and terminat-

ing in a continuous, unbroken, hard, radiating surface adapted to be inserted through a lip seal into a person's mouth containing a liquid couplant for ultrasonically cleaning the person's teeth when said radiating surface is positioned in close proximity to said teeth, said ultrasonic distributor means including a longitudinally extending hollow tubular body having a head at one end and having



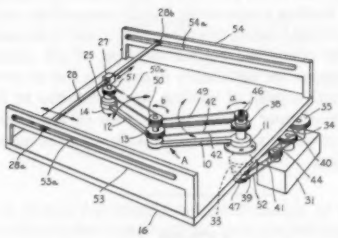
upper and lower transversely extending grooves for receiving upper and lower teeth when said head is inserted into the oral cavity and having acoustical mirror means at one end thereof for impeding the flow of sonic energy axially of said longitudinally extending body and for redirecting such ultrasonic energy toward said transversely extending grooves.

4,176,455

PLOTTING APPARATUS

Thomas M. Copeland, Rte. 1, Box 125-A, Columbia, S.C. 29203; Kenneth J. Feinberg, 619 King St., Apt. 604, Columbia, S.C. 29205, and Alfred H. Vang, 4202 Sequoia Rd., Columbia, S.C. 29206

Filed Feb. 24, 1977, Ser. No. 771,775
Int. Cl.[2] G01D *7/10*
U.S. Cl. 33—1 M **15 Claims**



1. A plotting apparatus for use in an automatic reproduction system having an input source for supplying first and second control coordinate signals to control the positioning of said plotting apparatus in making a plot on the associated workpiece, said plotting apparatus comprising:

a work table for supporting said workpiece;

a pivoted arm carried in a superposed postion above said work table;

an instrument head carried by said pivoted arm adjacent a distal end thereof;

a work instrument carried by said instrument head;

power operated means operably connected to said pivoted arm for pivoting said arm through an angle responsive to a first control coordinate signal; and

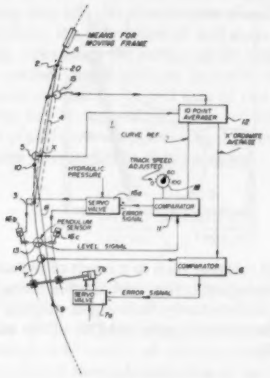
said power operated means imparting translatory movement to said pivoted arm responsive to a second control coordinate signal.

4,176,456

AUTOMATIC INTEGRATING LINER

Helmuth von Beckmann, Columbia, S.C., assignor to Canron, Inc., New York, N.Y.

Filed Oct. 25, 1977, Ser. No. 844,819
Int. Cl.[2] E01B *33/00*
U.S. Cl. 33—1 Q **15 Claims**



11. An apparatus for reducing railroad track position errors comprising: a first measuring system having a leading point and a trailing point and means for establishing a reference line between said points; a measuring means located between said points for measuring a track position value relative to said reference line; means to move said first measuring system over a section of track for enabling said measuring means to measure a series of said track position values at a series of points extending over a specified distance along the track; means connected to said measuring means to store the series of track position values and to average them; a track correcting means attached to and trailing said first measuring system along the track; an independent track location sensing system for said track correcting means, which locating sensing system includes a leading point and a trailing point and means for establishing a second reference line between said lastmentioned points; sensor means located between the said points of the second reference line, for sensing a track location value relative to said second reference line; comparator means connected to said means to store and average the track position values and to said sensor means to compare said average position value with said location value and provide a position error value; and means connected to said comparator means for applying said position error value to control the operation of the track position correcting means to reduce an existing track position error.

4,176,457

COMBINED DIPSTICK BREATHER TUBE

Gary L. Keffeler, Lacon, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 18, 1978, Ser. No. 4,795
Int. Cl.[2] G01F *23/04*
U.S. Cl. 33—126.7 R **12 Claims**

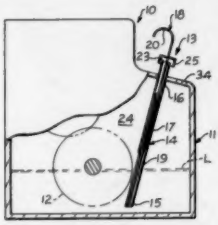
1. A device **(13)** having means for measuring the level of liquid (L) in a housing **(11)** notwithstanding turbulence of the liquid therein and defining means for passing gaseous fluids into and from the housing above the level of the liquid therein, said device comprising:

a tube **(14)** having a first end portion **(15)** adapted to be received in the liquid (L), an opposite second end portion **(16)** adapted to project upwardly through a portion **(34)** of the housing and having an upper open end **(23)**, and a midportion **(17)** having an opening **(22)** therein for passing gaseous fluids;

a dipstick **(18)** extending removably longitudinally within

said tube (14) and having an end portion (20) outwardly of said tube second end portion for manipulation of the dipstick; and

a baffle (26) in said tube midportion (17) inwardly of said opening (22) for preventing liquid passed inwardly



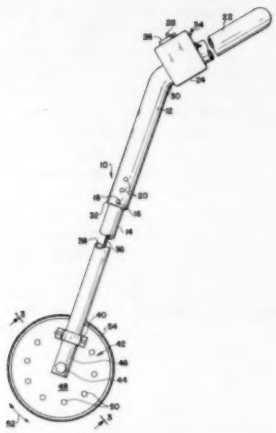
through said opening such as a result of turbulence in the liquid for impinging against said dipstick thereof, said tube and baffle cooperatively defining a gaseous fluid flow passage between said upper end (23) of the tube and said opening (22).

4,176,458

DISTANCE MEASURING APPARATUS

Christopher H. Dunn, 23 Emily St., Parry Sound, Ontario, Canada

Filed Mar. 27, 1978, Ser. No. 890,274
Int. Cl.[2] G01B 3/12
U.S. Cl. 33—141 E 5 Claims



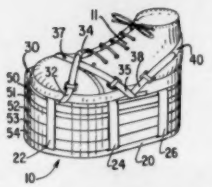
1. A distance measuring apparatus comprising a handle, a wheel, said wheel removeably secured to one end of said handle, said wheel having a plurality of protrusions mounted to a lateral surface thereof, means to optically sense proximity of each of said plurality of said protrusions including a photoelectric cell, a light source, and said protrusions having a light reflective surface for reflecting light emanating from said light source into said photoelectric cell, said photoelectric cell and said light source being disposed adjacent said lateral surface, means to electrically store in memory the number of protrusions that have come into proximate relationship with said photoelectric cell, means to electrically visibly display a proportional number to a count of said numbers, means to selectively modify said proportional number from one system of linear measurement to another system of linear measurement so displayed.

4,176,459

FOOT ELEVATION MEASURING DEVICE

Donald A. Perser, Northbrook, and Donald A. Roman, Des Plaines, both of Ill., assignors to Ballert Orthopedic Corp., Chicago, Ill.

Filed Apr. 3, 1975, Ser. No. 564,845
Int. Cl.[2] G01B 3/30; A61F 3/00
U.S. Cl. 33—174 D 17 Claims



1. A device for measuring the relative difference in an individual's leg lengths in order to determine the amount of elevation required in the construction of an orthopedic shoe, to compensate for such difference, said device comprising a flat planar base plate of predetermined thickness; a flat planar sole plate of predetermined thickness and having a plan configuration similar to said base plate and being positionable in an overlying relationship relative thereto; at least one flat planar measuring plate of predetermined thickness and having a plan configuration similar to said base plate, said measuring plate being positionable between said base plate and said sole plate to increase the elevation of said measuring device by the predetermined thickness of said measuring plate; first, second and third pairs of holding straps respectively secured to said base plate adjacent to opposite ends thereof and intermediate the ends thereof, means for detachably connecting said pairs of holding straps to said sole plate to prevent relative movement of said sole plate, base plate and measuring plate; and binding means for securing said assembled sole plate and said base plate to the foot of the associated person, said binding means comprising first and second pairs of binding straps adapted to overlie the toe and ankle portions of the foot of the associated wearer, said binding straps being fixedly secured to said sole plate, a pair of heel binding straps secured to said sole plate and adapted to be connected behind the heel of the associated person, and means for detachably connecting the cooperating ends of respective pairs of binding straps, thereby to fixedly secure said measuring device to the foot of the associated person so as to allow said person to walk with the measuring device attached.

4,176,460

OPTO-MECHANICAL MEASURING SYSTEM

Morton Kaye, 122 Third St., Stamford, Conn. 06905

Continuation-in-part of Ser. No. 713,701, Aug. 12, 1976, Pat. No. 4,112,579. This application Jul. 13, 1977, Ser. No. 814,971
Int. Cl.[2] G01B 5/02
U.S. Cl. 33—174 L 12 Claims

1. A quality control apparatus comprising:

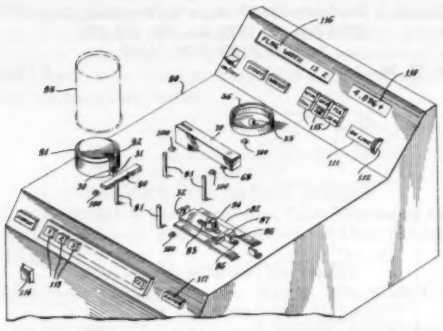
a plurality of test stations, each having means for manually receiving an article of a given type and means for measuring a separate type of parameter of said article,

alphanumeric indicating means,

means coupled to each of said measuring means for producing digital signals corresponding to the parameter measured at the respective station, said digital signal producing means comprising a common digital signal generating means for all of said stations,

control means including a program memory and connected to display instructions on said indicating means sequen-

tially directing the insertion of an article at said station by an operator, and



means connected to apply said digital signals to said indicating means for sequentially displaying data thereon corresponding to the respective parameter measured.

4,176,461

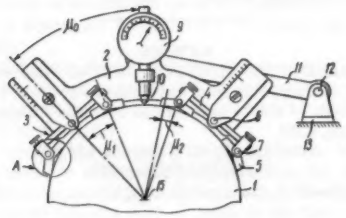
DEVICE FOR MEASURING THE DEVIATION OF OBJECT WITH NOMINALLY CIRCULAR CROSS-SECTION FROM THE ROUND SHAPE

Iosif D. Gebel; Arkady A. Zykov; Askold I. Nefedov; Viktor I. Parshikov, and Viktor F. Khrolenko, all of Leningrad, U.S.S.R., assignors to Spetsialnoe Knostruktorskoe Bjuro PO Proektirovaniju Shlifovalnogo Oborudovania, Leningrad, U.S.S.R.

Continuation-in-part of Ser. No. 466,889, May 3, 1974, Pat. No. 3,942,253. This application Feb. 12, 1976, Ser. No. 657,688

Int. Cl.[2] G01B *5/20, 5/28*

U.S. Cl. 33—178 D **4 Claims**



1. A device for measuring the deviation of objects with nominally circular cross-sections from a round shape, comprising: a base; a displacement transducer secured to said base and including a sensing element for contacting the surface of the object to be measured; a device for visualizing the response of said transducer; a support device mounted on said base and including self-adjusting balance beams mounted to pivot about respective swing axles, arranged in a plurality of support steps, the latter including: at least a first step and a last step, each step except said last step being the preceding step for some other step, and each step except said first step being the subsequent step for some other step; said axles of said first step being directly secured to said base, said axles of said step except said first step being directly secured to respective ends of said beams of said preceding steps, and said beams of said last step having areas for contacting the surface of the object; the disposition of said axles of the first step being determined by central angles defined by radii drawn from a center of relative rotation of the object to said axle of the respective beam of said first step and to the middle of a segment interconnecting said axles of the first step; wherein said beams are symmetrical relative to a plane passing through their respective axles and said center of relative rotation, and a pair of beams of each step except said first step is symmetrical relative to said plane passing through said axle of the respective beam of said preceding step and said center of relative rotation; the disposition of said axles of two beams of each subsequent step of said preceding step being determined by central angles defined by radii drawn from said center of relative rotation to said axle of one of said beams of the preceding step and one of said axles of said subsequent step installed thereon; the disposition of said areas on the beams of said last step, contacting the surface of the object, being determined by central angles defined by radii drawn from said center of relative rotation to said axle of one of the beams of said last step and to the middle of one of said areas situated thereon; all of said central angles being determined on the basis of a condition of minimizing the expression

$$P_{yn} = \left| \frac{\sin n\mu_o}{\sin \mu_o} \prod_{i=1}^{i=k} \frac{\cos n\mu_i}{\cos \mu_i} \right|$$

wherein: P_{yn} is a value determining the amplitude of the harmonic n of displacement of the center of the profile of the cross-section of the object in a direction of a straight line passing through said center of relative rotation and parallel with a plane drawn through said axles of said first step;

n is a serial number of harmonics $n=2; 3; 4;$

μ_o is a central angle defined by radii drawn from said center of relative rotation to said axles of one of said beams of the first step and to the middle of a segment interconnecting said axles of the first step;

i is a serial number of the step of self-adjusting balance beams $1 \leqq i \leqq k;$

μ_i is a central angle defined by radii drawn from said center of relative rotation of said axles of one of said beams of the step i and one of said beams of the step $i+1$, mounted thereon, selectively with $i=k$, to the middle of an area adapted to contact one of said beams of the last step with the surface of the object and said axle of said one beam of the last step;

$\prod_{i=1}^{i=k}$

is a symbol that stands for the product of cofactors ranging from $i=1$ to $i=k$;

and wherein said sensing element contacts the surface of the object in a point on said straight line passing through said center of relative rotation and parallel with the plane drawn through said axles of said first step.

4,176,462

APPARATUS FOR INSPECTING THE GEOMETRY OF DUAL ROLLER TRACKS FOR CONTINUOUS CASTINGS

Karl Hölter, and Gustav Wiegard, both of Witten, Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Düsseldorf and Gustav Wiegard Maschinenfabrik, Witten, both of, Fed. Rep. of Germany

Filed Nov. 2, 1978, Ser. No. 957,233

Claims priority, application Fed. Rep. of Germany, Nov. 3, 1977, 2749539

Int. Cl.[2] G01B *7/00, 7/28*

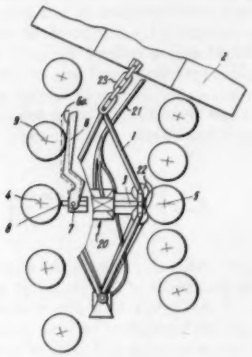
U.S. Cl. 33—182 **6 Claims**

1. Apparatus for determining the relative disposition of rollers in a dual roller track for withdrawing a continuous casting, the apparatus including a foldable frame having two opposing corners each provided with at least one pair of centering rollers for establishing a center line between said corners which extends transversely to the tracks when the pairs of centering rollers engage oppositely located rollers of the track

in an operating position of the frame, the improvement comprising:

at least one ruler having an offset portion;

means for pivotally mounting said ruler at said offset portion on a point on said center line at a distance from one of the rollers traversed by said line when said frame is in said operating disposition; and



means for measuring the pivot angle of said ruler when engaging a track roller of the same track as the one roller and being disposed next to it, the pivot angle being taken to said center line or a line having a fixed orientation to that center line.

4,176,463

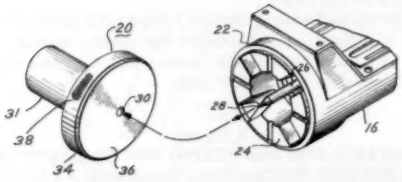
WHEEL ALIGNMENT GAUGE ASSEMBLY AND ADAPTER THEREFOR

Gerald D. Ringle, 3025 W. U.S. 12, Michigan City, Ind. 46360

Filed Jun. 14, 1978, Ser. No. 915,381

Int. Cl.[2] G01B *11/275*

U.S. Cl. 33—203.18 **10 Claims**



1. An alignment gauge assembly for a vehicle wheel having a spindle with a threaded outer end, comprising an adapter having a shank with a threaded, axially disposed hole in one end thereof for mounting on the threaded end of the wheel spindle in axial alignment therewith, a head of magnetic attractable material disposed on and rigidly attached to the other end of said shank and having an outwardly facing surface on a plane at right angles to the axis of said shank and a means defining a center recess in the face thereof for receiving a centering pin, and a gauge having a permanent magnet therein seating on said outwardly facing surface, a center pin seating in said center recess for centering said gauge with respect to the axis of said shank, and scales thereon for determining the caster and camber of the wheel.

4,176,464

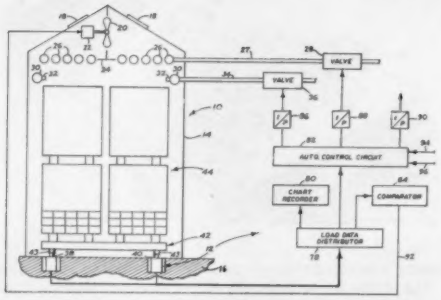
METHOD AND APPARATUS FOR THE CONTROLLED DRYING OF LUMBER AND THE LIKE

George J. J. Randolph, 803 SE. Kane St., Roseburg, Oreg. 97470

Filed Jan. 26, 1978, Ser. No. 872,452

Int. Cl.[2] F26B *5/00, 21/00*

U.S. Cl. 34—16.5 **5 Claims**



1. In a dry kiln and the like including a defined drying zone and control means regulatable to control drying therein, apparatus for guiding the removal of moisture from a charge within said zone, said apparatus comprising

a plurality of spaced-apart weight sensors operable to follow changes in the weights of different portions of a charge placed in said zone, and

means operatively interconnecting said sensors and said regulatable control means for regulating the latter in accordance with the respective weights sensed by the former,

said control means including changeable-direction gas-flow-producing means, and

said interconnecting means, including means responsive to differences in the particular weights sensed by said sensors to adjust the direction of gas-flow created by said gas-flow-producing means.

4,176,465

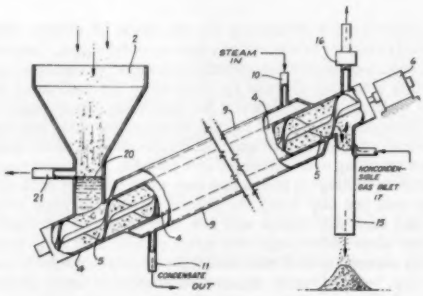
HEAT SAVING METHOD FOR DRYING WET SOLIDS

Robert G. Murray, Palo Alto, and Benjamin J. Gikis, Los Altos Hills, both of Calif., assignors to Natomas Company, San Francisco, Calif.

Filed Jul. 18, 1977, Ser. No. 816,497

Int. Cl.[2] F26B *3/24*

U.S. Cl. 34—31 **4 Claims**



1. In a method for drying wet particulate matter continuously moving upwardly in a screw flight conveyer loaded with said matter which is being heated to vaporize the liquid wetting the particles, the improvement leading to heat savings which comprises maintaining a non-condensable gas barrier at the upper end of the screw flight whereby the vapors formed

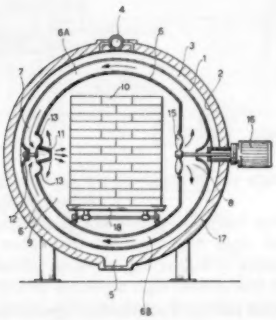
by heating the wetting liquid are blocked from leaving the flight at said end and whereby said blocked vapors are induced to flow downwardly through the upcoming particulate matter for condensation by the incoming, cooler, wet particulate matter present in the lower end of the screw flight, thereby effecting an internal transfer of the heat of vaporization of the wetting liquid and a consequent reduction in the heat required to dry the particulate matter.

4,176,466

APPARATUS FOR DRYING TIMBER

Ernesto G. Pagnozzi, Via Camponuova, Cairo Montenotte (Savona), and Vincenzo Pagnozzi, Rocchetta di Cairo (Savona), both of Italy

Filed May 6, 1977, Ser. No. 794,587
Claims priority, application Italy, May 12, 1976, 68164 A/76
Int. Cl.[2] F26B *9/06*
U.S. Cl. 34—233 **11 Claims**



1. In a timber drying kiln comprising a kiln chamber for a stack of timber to be dried and means for circulating within the chamber a drying gas for said stack of timber, said means comprising:

a nozzle opening directly into said chamber,

means feeding said nozzle with a flow of said drying gas in heated condition thereby to produce a jet of hot drying gas from said nozzle,

means movably mounting said nozzle so that the latter can be pointed in different directions across the chamber thereby to cause said jet to impinge onto different portions of a lateral face of a stack of timber in said kiln chamber, and

means for controlling the movement of said nozzle whereby to direct the jet of gas sequentially over the entire lateral face of said stack of timber.

4,176,467

APPARATUS FOR ALIGNING THIN SHEETS AT WORK STATION

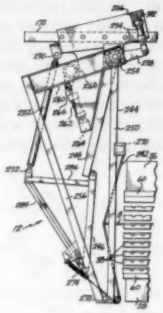
Byron B. Brookhyser, Milton, Wash., assignor to Weyerhaeuser Company, Tacoma, Wash.

Filed Mar. 20, 1978, Ser. No. 888,454
Int. Cl.[2] F26B *25/00*
U.S. Cl. 34—236 **5 Claims**

1. An apparatus for aligning thin sheets within at least one opening of a substantially horizontally disposed work station when the sheets are transported past the back edge of the opening, comprising:

a vertically extending thin resilient flexible backing member positioned adjacent the opening and substantially across the back edge thereof;

a rigid vertically extending movable patting face positioned behind the backing member; and



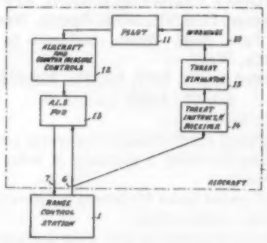
means for moving the patting face from a retracted position to a forward position when a sheet impacts the backing member, thereby realigning the position of the sheet.

4,176,468

COCKPIT DISPLAY SIMULATOR FOR ELECTRONIC COUNTERMEASURE TRAINING

William B. Marty, Jr., 535 Margarita Ave., Coronado, Calif. 92118

Filed Jun. 22, 1978, Ser. No. 918,013
Int. Cl.[2] G09B *9/00*
U.S. Cl. 35—10.4 **10 Claims**



1. In an aircraft used for range training of a pilot in electronic warfare, an apparatus for simulating the detection of impeding threats to the aircraft which comprises:

means for receiving a radio control instruction defining at least one simulated impeding threat;

means, responsive to the control instruction for generating at least one warning control signal; and,

means responsive to said control signal for warning the pilot of said simulated threat.

4,176,469

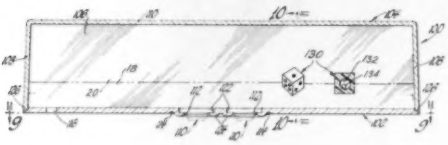
WAVE SIMULATOR

Gary G. Timco, 300 S. Silvery La., Dearborn, Mich. 48124

Continuation-in-part of Ser. No. 852,270, Nov. 17, 1977, abandoned, which is a continuation-in-part of Ser. No. 768,297, Feb. 14, 1977, abandoned. This application Mar. 27, 1978, Ser. No. 890,100
Int. Cl.[2] G09B *23/12*
U.S. Cl. 35—19 R **8 Claims**

1. A wave simulator comprising: an enclosed receptacle of an elongated shape having an elongated interior; non-mixing liquids received within the interior of the receptacle; one of the liquids being alcohol and another being oil such that the alcohol provides a lower liquid layer that simulates wave action upon tipping of the receptacle; the receptacle having a two-

piece construction including an injection molded unitary bottom wall of clear polycarbonate plastic and an upper wall member which is injection molded from clear polycarbonate plastic and has unitary top, side, and end walls; the bottom wall having edges bonded to the side and end walls of the upper wall member; at least one round opening through the bottom wall of the receptacle; the bottom wall also having a downwardly projecting annular rib extending about the opening thereof and defining a recess thereabout; a round flexible diaphragm closing the opening in the bottom wall; said diaphragm having a thickened round peripheral portion secured to the



bottom wall within the recess about the opening thereof and said diaphragm also having a thinner intermediate portion with a first side that faces upwardly in communication with the liquids and a second side that faces downwardly in communication with the environmental atmosphere; and the intermediate diaphragm portion having annular steps that extend vertically from the round periphery of the diaphragm such that the intermediate diaphragm portion flexes upwardly and downwardly to prevent excessive liquid pressure buildup within the receptacle while maintaining the receptacle interior completely filled with the liquids.

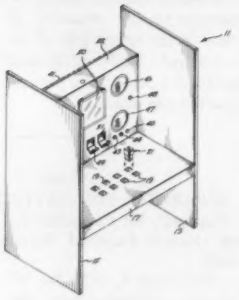
4,176,470

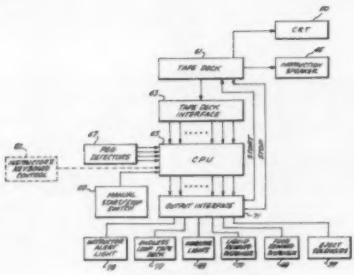
EDUCATIONAL REINFORCEMENT APPARATUS

Emerson O. Fosner, 1118 NE. 185th, Seattle, Wash. 98155, and Vernon L. Post, Kent, Wash., assignors to Emerson O. Fosner, Seattle, Wash.

Filed Sep. 1, 1977, Ser. No. 829,933
Int. Cl.[2] G09B *1/06, 5/06*
U.S. Cl. 35—22 A **5 Claims**

1. An educational reinforcement apparatus comprising:
a work surface including a plurality of holes for receiving coded items;
a plurality of coded items for insertion into said plurality of holes in said work surface;
detecting means mounted in said work surface for detecting the presence of coded items inserted into said holes in said work surface;
instruction and control means including a tape deck for producing audio instructions regarding the insertion of said coded items into said holes in said work surface and control signals related to the nature of said instructions, said instruction and control means also including an instruction speaker and a central processing unit, said central processing unit connected to said detecting means and including control signal storage means and comparing means, said tape deck connected to said instruction speaker and said central processing unit so as to simultaneously apply said audio instructions to said instruction speaker and said control signals to said control signal storage means, said comparing means of said central processing unit connected to said control signal storage means for comparing the detected presence of coded items inserted into said holes with the control signals stored in said control signal storage means related to the instructions given regarding the insertion of coded items into said holes in said work surface;
reward means connected to said instruction and control means for providing a reward when said comparison means determines that coded items have been inserted in said holes in said work surface in accordance with said instructions; and,
an eject solenoid located at the bottom of each of said holes in said work surface, said eject solenoids connected to said central processing unit such that said central processing





unit causes said eject solenoids to eject coded items in said holes in accordance with a predetermined set of instructions

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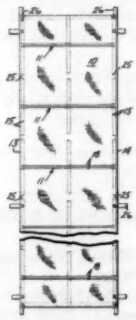
4,176,471

MARCHING GUIDE

Thomas J. Roe, P.O. Box 261, Rte. 7, Bel-Clare Acres, St. Cloud, Minn. 56301

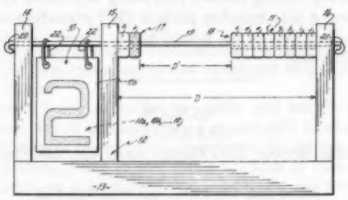
Filed Dec. 8, 1977, Ser. No. 858,706
Int. Cl.[2] A63B *71/00;* **G09B** *19/00*
U.S. Cl. 35—29 R **18 Claims**



1. A marching guide for instructing step length in marching, comprising an elongate runner of flexible material for spreading on a marching surface, and means for providing tactile reference of a preselected height above the material of the marching surface at spaced intervals of a desired marching step length along said runner to a person marching along said runner, said tactile reference means including means defining a

plurality of marker ridges at regular spaced intervals fixed along the runner for engagement by the feet of a person marching along the guide to indicate proper step length, said ridges having sufficient height to cause a tactile response in a person stepping upon one of said ridges.

4,176,472
NUMBERS TEACHING AID
Mary T. Devanney, 2665 Section Rd., Cincinnati, Ohio 45237
Filed Jan. 9, 1978, Ser. No. 867,816
Int. Cl.[2] G09B *19/02*
U.S. Cl. 35—32 3 Claims



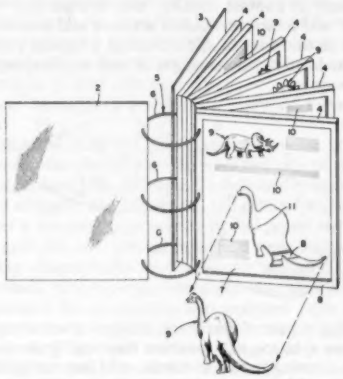
1. A numbers teaching aid for teaching the significance of numbers, said aid comprising,

a series of flip cards positioned in a set and unchangeable sequence, each card having single digit indicia only thereon, said flip cards being arranged in numerical order as determined by the single digit indicia, and the color of each digit being different from the color of every other digit, and

a plurality of beads positioned in a set and unchangeable sequence, the number of beads being equal in number to the number of flip cards if no flip card is provided with the digit 0 and equal in number to the number of flip cards minus one if one of the flip cards is provided with the digit 0, the color of each bead being different from the color of every other bead, the color sequence of said beads being the same as the color sequence of said digits, and said beads being movable from a storage position into a number equivalent position where the color of the last bead moved to the number equivalent position from the storage position will be the same as the color of that number on an exposed flip card where the number of beads so moved is equal to the digit on the flip card.

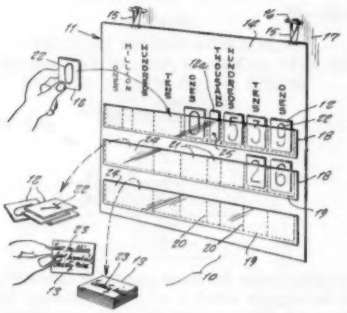
4,176,473
BOOK WITH REMOVABLE THREE DIMENSIONAL FIGURINES
Donald A. Rae, P.O. Box 51, Jenkintown, Pa. 19046
Filed Nov. 18, 1977, Ser. No. 852,801
Int. Cl.[2] G09B *19/00*
U.S. Cl. 35—35 E 10 Claims

1. A book which comprises a plurality of pages each having a relatively thin, flat area at least partly surrounded by a peripheral frame, the flat area being provided with a cut away area formed to closely approximate the configuration of an object, and a three dimensional object of width greater than the thickness of the flat area, the object being held within the confines of the cut away area by frictional force between the object and the edge of the cut away area, whereby the object is retained within the page, and the object being adapted for subsequent removal from and reinsertion into the page, the peripheral frame being of greater thickness than the width of the object; and wherein



the pages are adapted to fold together with adjacent portions of the peripheral frames in contact respectively.

4,176,474
VISUAL TEACHING AID FOR NUMBER CONCEPT
Rita O'Sullivan, 165 Thomas St., Brentwood, N.Y. 11717
Filed Sep. 1, 1978, Ser. No. 938,880
Int. Cl.[2] G09B *1/08*
U.S. Cl. 35—73 3 Claims

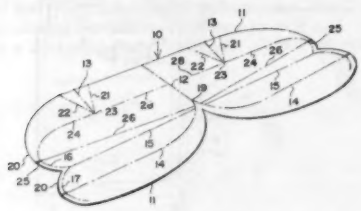


1. A visual teaching aid for number concept, comprising in combination, a display board, a first deck of cards for selective display on said board, and a second deck of cards each one of which has a whole number printed thereupon in words, each card of said first deck having a numerical digit printed thereupon, and said board having at least one horizontal row of stations in each of which one said card of said first deck is placable, a right endmost station being identified as "ones", and successively next left stations being identified as "tens", "hundreds", "thousand", "ones", "tens", "hundreds", "million" and "ones".

4,176,475
FOOTWEAR CONSTRUCTED FROM A SINGLE PIECE OF MATERIAL
Lucy M. Arcamonte, 780 Nightingale Ave., Miami Springs, Fla. 33166
Filed May 1, 1978, Ser. No. 901,624
Int. Cl.[2] A43B *1/02*
U.S. Cl. 36—9 R 2 Claims

1. A footwear having heel and toe portions produced from a

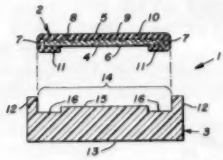
single piece of material having a fleece-like surface comprising a pair of symmetrically disposed portions folded at a mid-portion, one upon the other in superimposed relation with said outer surfaces in contact relation, said mid-portion forming said heel of said footwear, stitches sewn on said superimposed portions from said heel to said toe along a bottom portion in spaced relation to the outer edges of said superimposed portions forming a pair of first flaps, stitches sewn along a top portion from said toe to a position removed from said heel forming an opening in said footwear, said last named stitches being positioned in spaced relation to the top edge portion to form a second flap whereby upon folding said first and second flaps and turning said footwear inside out, said flaps become inner linings for said footwear with said fleece-like surface exposed on all portions of said footwear.



4,176,476
CUSHION INSOLE

Aarno A. Hassell, Storrs, Conn., assignor to Rogers Corporation, Rogers, Conn.

Filed Apr. 14, 1978, Ser. No. 896,169
Int. Cl.[2] A43B *13/40*
U.S. Cl. 36—44 **5 Claims**



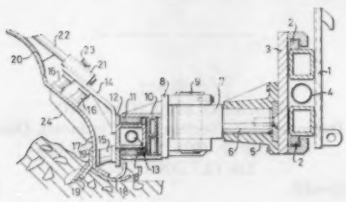
1. A cushion insole for shoes consisting essentially of:
means for support which is relatively rigid and stiff; and
a unitary combination sheet material comprising a skin of wear material integral with a layer of resilient foam material, said foam material being adhered to said means for support.

4,176,477
COMPACT UNIT FOR EXCAVATING, COMPACTING AND LOADING

Arne Fardén, Harjagersgatan 7,, 245 00 Staffanstorp, Sweden

Filed Mar. 1, 1978, Ser. No. 882,096
Int. Cl.[2] E02F *5/22*
U.S. Cl. 37—104 **6 Claims**

1. A compact unit for excavating, compacting and loading material on a horizontal or sloping surface, comprising an oblong excavation blade (17) and at the lower edge thereof in relation to the advancing direction both forwardly-downwardly directed breaking teeth (19) and behind the same a compactor (18), characterized in that the excavation blade is supported via a plurality of elastic members (15,16) by a carrier beam (12), which is limited pivotal in the horizontal and vertical plane, and at least one amplitude limiter (30) is attached between the excavation blade (17) and the carrier beam (12), which amplitude limiter comprises a sliding body (32) supported by the excavation blade (17) and having an upper top sliding surface (33) and an oblique sliding surface (36), which is formed by a lateral block (35) and preferably has an angle to the top sliding surface of 135°, and a stop member (37), which is supported by the carrier beam (12) and has a top block (39)

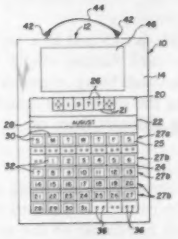


above the top sliding surface (33) being adjustable in relation thereto, and a stop member portion (37') extending along the sliding surface (36) of the lateral block, but at a certain small distance thereto.

4,176,478
CALENDAR

Marie-Louise Brewer, 5203 Gaston Ave., Apt. 108, Dallas, Tex. 75214

Filed Jul. 12, 1978, Ser. No. 923,964
Int. Cl.[2] G09D *3/00*
U.S. Cl. 40—107 **4 Claims**



1. A calendar for perpetually displaying the months and years comprising: a body having a flat planar front surface and a cavity formed in the rear surface, said front planar surface having a plurality of lines dividing the front surface into segments for displaying the year, the month, and the days of the month; a plurality of rectangular strips having numeral indicia printed thereon for indicating the year; a plurality of elongated strips having indicia printed thereon for indicating the month; a plurality of strips having indicia indicating the day of the week; strips having indicia printed thereon for indicating the numerical day of the month; tacks having ferris metal therein secured within each of the segments on the planar surface of the body; tacks secured in horizontal lines in spaced relationship in the hollow cavity of the body; magnetic tape secured to the rear portion of each of the strips adapted to be attracted to the tacks on the front surface of the body and the hollow cavity of the body so as to secure the appropriate strip in the appropriate segment; and closure means pivotally secured to the rear portion of the calendar.

4,176,479
LABEL OR TAG

Paul A. L. l'Hoir, Arnhem, Netherlands, assignor to B. V. Etikettenfabriek Gebroeders Mogendorff, Zevenaar, Netherlands

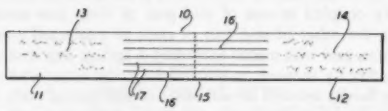
Filed Sep. 17, 1975, Ser. No. 614,279
Int. Cl.[2] B32B *3/10, 3/02*
U.S. Cl. 40—2 R **16 Claims**

1. A label or tag comprising an elongated, longitudinally extending strip of sheet material, said strip comprising:

a first part adapted to have information marked thereon, said first part having first and second opposite ends, said first end being free and defining the extreme outer longitudinal end of said first part;

a second, elongated, longitudinally extending part of substantial length intended to be secured to an article of merchandise, said second part being connected at one end thereof to said second end of said first part;

said label or tag being provided on only said second part thereof with a plurality of laterally spaced, side-by-side incisions of substantial length extending generally in the



longitudinal direction of said second part and dividing said second part into a number of elongated strips of substantial length;

said strips being of sufficient width and length that said second part of said label or tag is securable to an article of merchandise by securing means which applies a lateral constricting force to said strips to cause at least some of the latter to at least partially overlie one another;

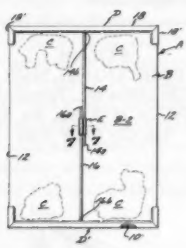
whereby if one or some of said strips is severed the remaining unsevered one or more of said strips will be effective to keep said label or tag secured to said article of merchandise by said securing means.

4,176,480

POSTER SUPPORTING FRAME

Rosendo Euzarraga, Anaheim; Robert J. Winkler, Irvine, and Robert D. Chapman, Mission Viego, all of Calif., assignors to Fred F. Solomon, San Diego, Calif.

Filed Jan. 9, 1978, Ser. No. 867,834
Int. Cl.[2] G09F 1/12
U.S. Cl. 40—155 **3 Claims**



1. In combination with a pliable rectangular poster that has a forward surface on which decorative material is depicted, a rearward surface, and forward narrow marginal end and side edge surfaces free of said decorative material, a frame for removably supporting said poster in a flat taut condition in a vertical position, said frame of the type that includes identical upper and lower frame assemblies, means for adjustably maintaining said upper and lower frame assemblies in a first vertical spaced relationship, the improvement in each of said frame assemblies for removably gripping one of said end marginal end surfaces and portions of said marginal side surfaces adjacent thereto to support said poster in said taut condition when said frame assemblies are in said first vertical spaced relation, each of said improved frame assemblies including:

A. an elongate rigid member of channel shape transverse cross section that is defined by a web and forward and rearward flanges that extend in the same direction from the longitudinal edges thereof, a pair of transversely aligned ribs that extend towards one another from said rearward and forward flanges and are spaced a substantial distance from said web, and a pair of mitered end extensions on opposite ends of said rigid member that extend therefrom in the same direction and are of the same structure as that of said elongate member, with said poster capable of having one of said marginal end surfaces and portions of said marginal side portions disposed in said frame assembly to overlie said rearward flanges thereof; and

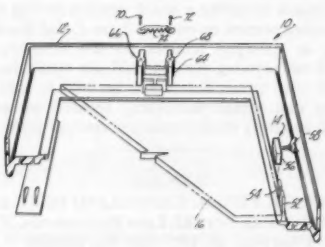
B. a plurality of resilient tubes having diameters substantially greater than the distance between said pair of ribs, each of said resilient tubes of a length substantially less than one of said elongate, rigid members, and each of said tubes when over a marginal edge portion of said poster overlying one of said ribs and into the space between said pair of ribs being diametrically and inwardly deformed, with the inwardly deformed portion of said tube most adjacent said rearward flange pressing said marginal edge portion of said poster into pressure frictional contact with said rib projecting from said rearward flange and portions of said tubing on each side of the rearwardly and inwardly deformed portion thereof pressure and frictionally contacting said marginal edge portion to cooperate with said rib projecting from said rearward web and said rearward and inwardly deformed portion of said tube in holding said marginal edge portion of said poster in a fixed position relative to said rearward flange, and said forward diametrically and inwardly deformed portion of said tube pressure and frictionally engaging said rib on said forward flange to the extent that said tube will not slide relative to said forward flange to be inadvertently displaced therefrom.

4,176,481

PICTURE FRAME ASSEMBLY

Robert J. Sawyer, P.O. Box 368, Boyne City, Mich. 49712

Filed Feb. 22, 1978, Ser. No. 880,146
Int. Cl.[2] G09F 1/12
U.S. Cl. 40—156 **7 Claims**



1. A frame assembly for mounting a flat object, the frame assembly comprising:

a unitary box-shaped frame member having a front face and a rear face and a viewing aperture extending therebetween;

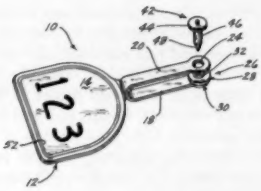
a plurality of flat locking flanges disposed adjacent said aperture and extending rearwardly from said rear face and said frame member so that the plane of the flanges is substantially parallel to the axis of the viewing aperture whereby the flat object is freely axially insertable between the locking flanges and, upon insertion, the locking flanges support said flat object against lateral movement;

wherein said locking flanges each include an axially extending through slot opening rearwardly and terminating at their other end proximate said frame member rear face;

a plurality of locking members lockingly engageable with said locking flanges at infinitely adjustable axial positions with respect to said frame member rear face and adapted

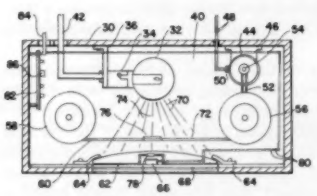
to clampingly engage said flat object to said frame member rear face; said locking members each comprising a T-bolt member having a supporting portion and a threaded shank extending outwardly from the supporting portion; a fastener which threadably engages the shank, said shank being slidably received in said slot when said fastener is partially threaded onto the shank and so that the supporting portion abuttingly engages said flat object, and so that the fastener is positioned on the side of the flange opposite from the flat object, whereby, upon tightening the fastener, the locking member becomes clamped to the locking flange and the supporting portion prevents axial movement of the flat object.

4,176,482
EAR TAG
Lester M. Steckel, Box 235, Taylor, Nebr. 68879
Filed Feb. 8, 1978, Ser. No. 876,056
Int. Cl.[2] G09F *3/00*
U.S. Cl. 40—301 **8 Claims**



1. An animal ear tag comprising,
a flat identification area having a pair of flat supporting arms extending therefrom in a parallel spaced-apart relationship adapted to receive the animal's ear therebetween,
each of said supporting arms having an opening formed therein adjacent the end thereof,
and a pin means extending through said openings and the animal's ear positioned therebetween to maintain the tag on the animal's ear,
said pin means including a shank portion having a pointed ear piercing portion on one end thereof, said shank portion having an enlarged retainer portion inwardly of said pointed ear piercing portion, said pin means including a retainer disc means detachably secured to said shank a retainer disc means detachably secured to said shank portion inwardly of said enlarged retainer portion.

4,176,483
MOBILE VISUAL SIGNALLING DEVICE
Daniel R. Bailey, P.O. Box 783, Lake Ronkonkoma, N.Y. 11779
Filed Nov. 18, 1977, Ser. No. 852,829
Int. Cl.[2] G09F *21/04*
U.S. Cl. 40—467 **10 Claims**



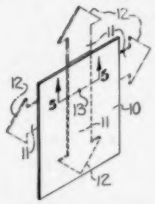
1. A mobile visual signalling device comprising a first display apparatus, a second display apparatus, each of said display apparatuses comprising a housing, a pair of reels journaled within said housing, a strip film, the ends of said strip film secured to said pair of reels, said strip film having a first indicia site and a second indicia site disposed adjacent one another, a light source, said light source being disposed within said housing, a viewing screen, said viewing screen disposed secured to said housing located adjacent said first indicia site, a photo-electric sensing device, said photo-electric sensitive device disposed adjacent said second indicia site and adjacent said viewing screen, said first indicia site carrying display indicia thereon having light transmission characteristics different from the remaining portions of said first indicia site, said second indicia site having an elongated indicia thereon possessing different light transmission characteristics than the remaining portions of said second indicia site, a motor, said motor rotationally coupled to one of said pair of reels, bias means for biasing the other of said pair of reels in a selected rotational direction, said bias means including a spring, one end of said spring fixedly secured to said housing, the other end of said spring fixedly secured to said other of said pair of reels, means to manually selectively energize said motor in an energized state wherein said motor may rotate in one of two directions, means to de-energize said motor upon said second indicia being aligned between said light source and said photoelectric device, an amplifier, said amplifier electrically coupled to said photo-electric device, said amplifier electrically connected to said motor, said means to de-energize said motor including a first relay and a second relay, a counter, said counter electrically coupled between said second relay and said amplifier, each of said first relay and said second relay having a pair of normally closed contacts, said pair of normally closed contacts of said first relay and of said second relay electrically coupled to said motor whereby said photo-electric device provides an output signal responsive to light emanating from said light source and traversing said second indicia so as to selectively operate said first relay and said counter operating said second relay and stopping said motor from further rotation upon selectively a single appearance of said second indicia and multiple appearances of said second indicia adjacent the location of said photo-electric device, whereby said first display apparatus and said second display apparatus each have their respective motors de-energized independently of one another upon said second indicia of each of said apparatuses being individually aligned between said light source and said photo-electric device of each of said apparatuses.

4,176,484
DIRECTIONAL SIGN
James M. Terris, 2126 Dillon Dr., Fayetteville, N.C. 28306
Filed Jul. 24, 1978, Ser. No. 927,644
Int. Cl.[2] G09F *7/00*
U.S. Cl. 40—584 **6 Claims**

1. A directional sign for providing observers with directional information to a particular location or event, said sign comprising a rectangular signboard; indicia provided on one face of the signboard describing the particular location or event; three directional indicators provided on said one face of the signboard closely adjacent three of the four edges of the signboard and oriented respectively upwardly, to the left, and to the right relative to said indicia for indicating three directions which could be followed to the particular location or event; and three respective lines extending across said one face

of the signboard respectively between said indicia and said three directional indicators to facilitate removing from view two of the three directional indicators when installing the directional sign for use so that only one directional indicator remains visible on the face of the signboard when the sign is installed and serves for indicating to observers of the sign the one correct direction which should be followed to the particular location or event.

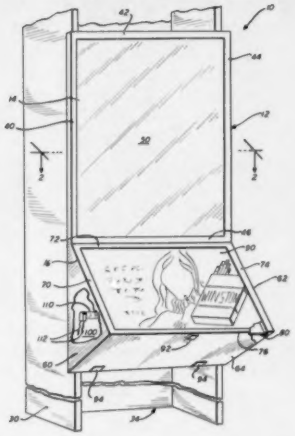
4,176,485
DIRECTIONAL SIGN
James M. Terris, 2126 Dillon Dr., Fayetteville, N.C. 28306
Filed Jul. 24, 1978, Ser. No. 927,645
Int. Cl.[2] G09F *7/00*
U.S. Cl. 40—584 **6 Claims**



1. A changeable direction sign for providing observers with directional information to a particular location or event, said sign comprising a rectangular sign board having a height dimension greater than its width dimension, indicia on the face of said sign board describing the particular location or event, an elongate indicator of a length no greater than the height dimension of said sign board, means pivotally securing said elongated indicator to the rear of said sign board at a predetermined location on the upper medial portion of said sign board so that the indicator when manually positioned either upwardly, to the left, or to the right, extends in projecting relation beyond either the upper or side edges of the sign board to thereby indicate to the observer of the sign that the direction which should be followed to said particular location or event is either straight ahead, to the left, or to the right, and when the indicator is positioned in a downward direction relative to the sign board, the indicator is in a storage position concealed behind and within the periphery of the sign board to facilitate packaging.

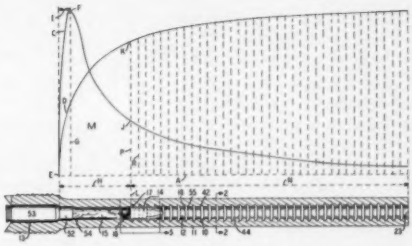
4,176,486
ADVERTISING DISPLAY
Lloyd Williams, 30 W. 86 St., New York, N.Y. 10024
Filed Jul. 8, 1977, Ser. No. 813,868
Int. Cl.[2] G09F *7/18*
U.S. Cl. 40—607 **10 Claims**

1. A display for mounting upon pillars of I-beam cross-sectional configuration; comprising:
(a) frame means;
(b) message display means carried by said frame means;
(c) display mounting means coacting with said frame means to support same at a predetermined position upon pillar of I-beam cross-sectional configuration;
(d) said display mounting means including holding means operative to exert forces upon opposed inner faces of the flanges of the I-beam so as to securely lodge said display



mounting means therebetween and so as to mount said display to the pillar.

4,176,487
FIREARM BARRELS AND PROJECTILES
John R. Manis, 84-6 Silver Lake Court, Mystic Island, P.O. Box 582, Tuckerton, N.J. 08087
Continuation of Ser. No. 308,755, Nov. 22, 1972, abandoned, which is a continuation of Ser. No. 90,608, Nov. 18, 1970, abandoned. This application Feb. 20, 1974, Ser. No. 444,008
Int. Cl.[2] F41C *21/00*; F41F *17/10*; F42B *11/00*
U.S. Cl. 42—76 R **18 Claims**

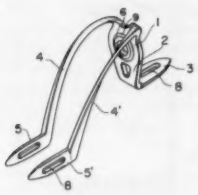


1. In a firearm barrel having a main bore,
at least one gas-relief chamber in a bore wall of said barrel constructed and arranged for imparting a rotational motion to a projectile moving along said barrel, said rotational motion being imparted to the projectile directly by the modulated flow of propellant gases moving past a rearward area of the projectile and expanding into said gas-relief chamber.

4,176,488
LINE GUIDE RING
Ryuichi Ohmura, Shizuoka, Japan, assignor to Fuji Kogyo Co., Ltd., Shizuoka, Japan
Filed Oct. 28, 1977, Ser. No. 846,350
Int. Cl.[2] A01K *87/04*
U.S. Cl. 43—24 **1 Claim**

1. A line guide for a fishing rod comprising a fixing ring; a single front supporting leg terminating at its distal end in a front mounting foot adapted to be fitted to the top of a fishing rod; a pair of rear supporting legs terminating at their distal

ends in rear mounting feet adapted to be fitted to opposite sides of the fishing rod, said rear supporting legs being moderately bent from the top of the fixing ring toward both sides of the fishing rod, being inwardly twisted by 90 degrees, and protruding from the top of the fixing ring to locate the tops thereof at a position higher than the upper edge of the fixing ring; said fixing ring, supporting legs, and mounting feet being integral and formed by punching from a single metal plate, and a guide ring mounted in said fixing ring.

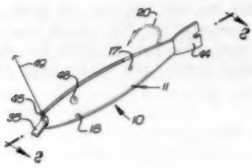


4,176,489

FISHING LURE WITH RETRACTABLE AND AUTOMATICALLY EXTENDABLE HOOK

Frank T. Levstik, 655 E. Main St. (Space 68), San Jacinto, Calif. 92383

Filed Dec. 20, 1977, Ser. No. 862,483
Int. Cl.[2] A01K *85/02*
U.S. Cl. 43—35 **2 Claims**



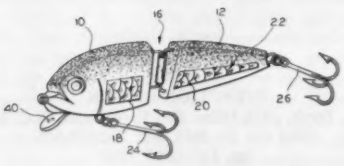
1. In combination:
a bait-fish shaped lure body;
a fish hook mounted in said body to be spring biased into a position extended therefrom;
trigger means for latching said hook in a position retracted into said body and operable when engaged by a fish seizing said lure in its mouth to release said hook causing it to be spring extended from said body and into said fish;
said lure body being molded in two halves which fit together on the longitudinal axial plane of symmetry of said body excepting where one or the other or both of said body halves are recessed laterally from said plane to provide chambers to accommodate the following operative elements in said body;
a hook pivot pin;
said fish hook having a hub, pivoted on said pin;
a radial actuating wire arm provided on said hub;
a hook extending and retracting bar apertured to slideably receive said hub arm and notched on opposite sides to trap a coiled expansive spring thereon;
said bar being notched on one side near its front end to form a cocking shoulder, and forming at its front end a cocking handle for said lure;
a trigger pivot pin near said cocking shoulder; and
a trigger lever pivoting on said pin and swingable into opposition to said cocking shoulder when said handle is pulled forwardly to cock said lure with said hook retracted into said lure, while also swinging the rear end portion of said trigger lever outwardly where it will practically certainly be depressed upwardly into said body by a fish seizing said lure in its mouth thereby releasing the hook biasing spring to extend the hook from the lure and into the fish.

4,176,490

HINGED FISHING LURE

Nicholas A. Philips, P.O. Box 1273, Traverse City, Mich. 49684

Filed Jan. 16, 1978, Ser. No. 869,932
Int. Cl.[2] A01K *85/00*
U.S. Cl. 43—42.15 **9 Claims**



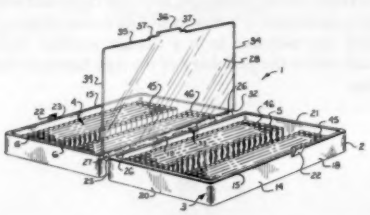
1. A fishing lure in the approximate shape and form of a fish, said lure comprising first and second body parts dimensioned to simulate the fore and aft parts of a fish, hinge means joining said parts together, said hinge means comprising two wire loops individually associated with the fore and aft parts, straight vertical sections in each of said loops positioned in a spaced parallel relationship, an elongated tube enclosing said vertical sections substantially throughout their length, the internal diameter of said tube having a relationship with the external diameter of said wire loops which enable said body parts to pivot freely with a limited amount of non-hinged twisting motion, to enable said first and second parts to move back and forth with a tail-wagging motion which is restricted primarily to virtually a single plane with a slight twisting motion, cavities formed in said body parts to form buoyance chambers which control the level at which said lure floats, and at least one hook attached to said lure.

4,176,491

STORAGE STRUCTURE FOR ARTIFICIAL FLY-TYPE FISHING LURES

John L. Herring, 2626 S. 48th Ter., Kansas City, Kans. 66106

Filed Feb. 28, 1978, Ser. No. 882,103
Int. Cl.[2] A01K *97/06*
U.S. Cl. 43—57.5 R **7 Claims**



1. A storage structure for artificial fly-type fishing lures, said storage structure comprising:
(a) a container having a base and an upstanding side wall; said side wall having a free edge defining an open end of said container;
(b) a closure shaped for mating with and sealing the open end of said container;
(c) a plurality of pegs mounted in said container and arranged in a plurality of elongate rows such that the pegs in adjacent rows are laterally in-line; each of said pegs having one end thereof connected with the base of said container, and a free end thereof extending substantially normally thereof; each of said pegs being semi-rigid, and having a frustroconical shape which tapers inwardly from

the one end to the free end thereof, whereby adjacently disposed pegs are adapted to receive and frictionally retain a rigid hook portion of one of said lures thereinbetween for detachably and wedgingly locking said lure in said container.

4,176,492

MAGNETIZED TOY WITH REMOVABLE APPENDAGES

Anson Sims, Granada Hills, and Lawrence T. Jones, Playa Del Rey, both of Calif., assignors to California R & D Center, Culver City, Calif.

Filed Dec. 23, 1977, Ser. No. 863,931
Int. Cl.[2] A63H *3/10*
U.S. Cl. 46—22 12 Claims

1. An articulated magnetized toy having at least one removable appendage comprising:

a body member;

magnetic means operatively positioned within the body member for removably retaining an articulated appendage, and

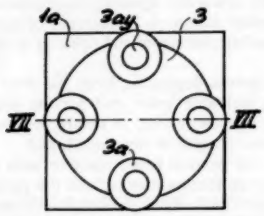
a unitary appendage connected to the magnetic means having a U-shape configuration including a base member having means for interconnecting with the magnetic means and a pair of upright members extending on either side of the body member, the pair of upright members being disposed to at least partially surround the body member.

4,176,493

ROTATABLE ELEMENT FOR TOY BUILDING SETS

Erling T. Dideriksen, Billund, Denmark, assignor to Interlego A.G., Baar, Switzerland

Filed Nov. 11, 1977, Ser. No. 850,676
Claims priority, application Denmark, Dec. 20, 1976, 5736/76
Int. Cl.[2] A63H *33/06*
U.S. Cl. 46—23 7 Claims



1. A rotatable element for a toy building set, said element comprising:

a one-piece base plate having a circular aperture therein;

a one-piece rotatable member, said member comprising a disc of a diameter substantially equal to but slightly less than that of the circular aperture and positioned therein, said disc being rotatable in the circular aperture for rotational movement relative to the base plate;

said base plate comprising four side walls defining a cavity therebetween and a socket connected to the side walls, said socket being in the cavity coaxial with the circular aperture;

said rotatable member comprising a pivot post rotatably mounted in the socket and a plurality of engagement studs on the upper surface of the disc adjacent the periphery thereof, each of said studs extending partly beyond the periphery of the disc to slidably contact the top face of the base plate during rotation of the disc.

4,176,494

AGRARIAN STAKE

Claude Boucher, and Jacqueline Boucher, both of 101 des Pres St., Vaudreuil-sur-le-lac, Canada (J7V 5V5)

Filed May 17, 1978, Ser. No. 907,133
Int. Cl.[2] A01G *9/12*
U.S. Cl. 47—47 2 Claims

1. An agrarian stake comprising a straight four sided rod-like, ground engaging element of uniform X-shaped cross-section throughout the major part of its length, said element defining four orthogonally disposed and radially outwardly extending arms having their longitudinal outer edges equally radially spaced from the longitudinal axis of said element, the outer longitudinal edge of each arm having an arrowhead cross-section defining, on each side of said arm, a laterally protruding flange making a 45 degree angle with the associated arm, said arms defining between themselves four similar spaces opening at the four sides of said element, said flanges being co-planar, two by two, and each pair of co-planar flanges forming one side of said element and partially closing said space, and a clasp consisting of a band of resilient material formed into a semi-annular shape for encircling a plant stem, said band having an out turned hook at each end for snap fit removable attachment with any one of said pair of flanges by insertion within the associated space, whereby said clasp may be attached at any point longitudinally of said element and to any of its four sides and said clasp may slide along said element upon a force exerted on the same in a direction substantially parallel to the longitudinal axis of said element.

4,176,495

APPARATUS AND METHOD FOR AUTOMATED INJECTION OF TREES WITH A TREATING LIQUID

Warren H. Dale, Hattiesburg, Miss., assignor to Hercules Incorporated, Wilmington, Del.

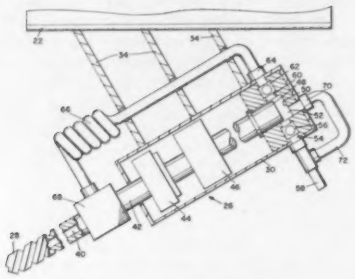
Filed Aug. 2, 1978, Ser. No. 930,473
Int. Cl.[2] A01G *29/00*
U.S. Cl. 47—57.5 18 Claims

1. Apparatus for injecting liquid into a tree comprising:

at least one drill bit having a fluid passageway therethrough;

means for rotating and reversibly advancing said drill bit to form a borehole in said tree;

means in communication with said drill bit for supplying a quantity of liquid substantially proportional to the volume



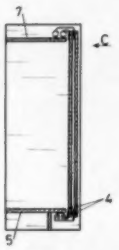
of said borehole through said passageway and injecting said liquid into said borehole.

4,176,496

GUIDE RAIL ASSEMBLY FOR SLIDING DOORS

Erich Röck, Höchst, and Bernhard Mages, Dornbirn, both of Austria, assignors to Julius Blum Gesellschaft m.b.H., Höchst, Austria

Filed May 4, 1978, Ser. No. 902,816
Claims priority, application Austria, May 13, 1977, 3433/77
Int. Cl.[2] E05D *13/02*
U.S. Cl. 49—410 **7 Claims**



1. A guide rail assembly for sliding doors, particularly sliding doors on pieces of furniture, said guide rail assembly comprising:

an elongated supporting rail for each sliding door and adapted to be fixed to a body of a piece of furniture, said supporting rail having a V-shaped profile defined by first and second elongated flanges extending at an angle of approximately 90° with respect to each other;

an elongated slide rail for each sliding door and adapted to be fixed to such sliding door, said slide rail having a V-shaped profile defined by first and second elongated flanges extending at an angle of approximately 90° with respect to each other;

an elongated roller-carrier assembly for each sliding door, said roller-carrier assembly including first and second groups of rollers, each said roller having a cylindrical surface defined about an axis of rotation, the axes of rotation of all of said rollers of each said group of rollers being parallel, said axes of rotation of said rollers of said first group extending substantially orthogonally to said axes of rotation of said rollers of said second group;

said roller-carrier assembly being loosely positioned between said supporting rail and said slide rail such that said cylindrical surfaces of said rollers of said first group are in rolling contact with said first flange of said supporting rail and said second flange of said slide rail, and said cylindrical surfaces of said rollers of said second group are in rolling contact with said second flange of said supporting rail and said first flange of said slide rail; and

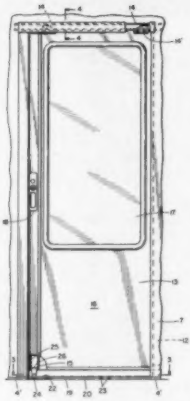
means for attaching said supporting rail to the body of the piece of furniture, and means for attaching said slide rail to the sliding door, such that said first and second flanges of said supporting rail and said first and second flanges of said slide rail extend at angles of approximately 45° to a plane which extends in the direction of movement of the sliding door and substantially transverse to the sliding door.

4,176,497

SLIDING DOOR AND THRESHOLD ARRANGEMENT FOR A RAILWAY PASSENGER CAR COMPARTMENT

Ernest J. Nagy, Munster, Ind., assignor to Pullman Incorporated, Chicago, Ill.

Filed Apr. 17, 1978, Ser. No. 896,943
Int. Cl.[2] E05D *13/02*
U.S. Cl. 49—411 **12 Claims**



1. For a railway passenger car compartment having a floor including an aisle and a pair of longitudinally aligned spaced vertical divider walls adjacent to said aisle and defining an access opening into said compartment, a sliding door and threshold arrangement for said opening, comprising:

a door having a vertical end member and a panel extending laterally of the door connected to said end member,

an elongated threshold plate on the floor and extending the width of the access opening beneath the door, said plate having an upwardly opening longitudinally extending guide channel therein and a plurality of spaced diverging slots extending therefrom and opening to the sides of the plate,

guide plate means depending from the door and having a vertically yieldable lower end portion slidably engaged within said guide channel to secure the lower end of the door against transverse movement, and

said lower end portion being reactive with said threshold plate to scrub foreign matter from the guide channel and move it outwardly through said slots during opening and closing movement of the door.

4,176,498

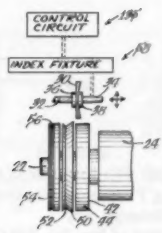
APPARATUS FOR EDGING LENSES

Yordan Vulich, Oak Lawn, and Wilfredo P. Loreto, Hoffman Estates, both of Ill., assignors to AIT Industries, Inc., Schaumburg, Ill.

Filed Feb. 21, 1978, Ser. No. 879,146
Int. Cl.[2] B24B *9/14*
U.S. Cl. 51—101 LG **20 Claims**

1. An apparatus for grinding the peripheries of articles such

as optical lenses and the like, comprising a grinding wheel having a grinding surface, means for rotating said grinding wheel about its axis, means for supporting an article, means for moving said supporting means and said grinding wheel together to move the periphery of the article into engagement with a portion which is less than the entirety of said grinding surface, means for rotating the article about an axis while its



periphery is against only said portion of said grinding surface, and means operative in response to successive articles being ground for operating said moving means to automatically periodically engage the peripheries of at least some of the successive articles against different portions each of which is less than the entirety of said grinding surface to sequentially engage all portions of said surface with the peripheries of articles so that said surface wears evenly and uniformly.

4,176,499

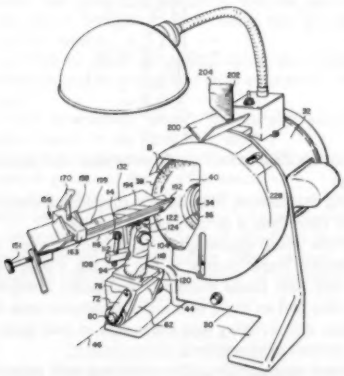
DRILL SHARPENER

Joseph Mazoff, 3136 Federal Ave., El Paso, Tex. 79930

Continuation-in-part of Ser. No. 775,972, Mar. 9, 1977, abandoned, which is a continuation-in-part of Ser. No. 639,221, Dec. 10, 1975, abandoned. This application Oct. 7, 1977, Ser. No. 840,304

Int. Cl.² B24B *3/28*

U.S. Cl. 51—124 R **17 Claims**



1. In a sharpener for a drill having a pair of helical flutes, each of which has a trailing edge, a cutting point face having a pair of facets, and a shank:

(a) a frame;

(b) a rotatably mounted grinding wheel supported on said frame and having a grinding face;

(c) a drill guide and holder having a drill axis locating means;

(d) mounting means supporting said guide and holder on said frame for positioning said drill axis locating means so that a drill thereon is at an angle with respect to the grinding face of said grinding wheel for grinding one facet of the cutting points of the drill at a time;

(e) drill flute engaging means on said guide and holder to engage one of said trailing edges with a point contact while each facet of said cutting point is ground by said grinding face;

(f) said grinding wheel being rotatable in a direction to cause one of said facets to create rotary torque that is imparted to the drill to force said trailing edge of said flute against said flute engaging means; and

(g) a drill shank abutment means on said guide and holder and disposed to be engaged by said shank to hold said drill in precise longitudinal position in said guide and holder to resist and prevent longitudinal axial movement of said drill in a direction away from said grinding face.

4,176,500

SPRINKLING DEVICE FOR GRINDING WHEELS

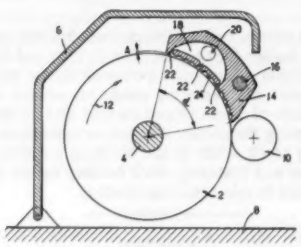
Bernard Bourgoin, Saint Etienne, France, assignor to Centre Technique des Industries Mecaniques, France

Filed Sep. 23, 1977, Ser. No. 836,007

Claims priority, application France, Sep. 24, 1976, 76 28732; Sep. 13, 1977, 77 27573

Int. Cl.² B24B *55/02*

U.S. Cl. 51—267 **6 Claims**



1. A sprinkling device for grinding wheels and like tools having a guard and a generally cylindrical active surface, said sprinkling device comprising a hollow deflecting shoe to be connected to a source of pressure sprinkling liquid, said hollow deflecting shoe having a U-shaped rigid body forming two cheeks and a deformable deflecting surface extending between said cheeks with a curvature located opposite to said active surface of said grinding wheel, said deflecting surface having two curved ends secured to said rigid body thus forming a chamber, said deflecting surface having sprinkling liquid exit apertures and teeth oriented substantially at right angles to the displacement of said active surface of said grinding wheel in order to turn said sprinkling liquid toward said grinding wheel; central supporting and adjusting means carried by the guard and operatively associated with said U-shaped rigid body for supporting and adjusting said shoe toward and away from said grinding wheel; and central curvature adjusting screw means carried by said U-shaped rigid body operatingly connected to the central portion of said deflecting surface of said shoe for adjusting the curvature of said deflecting surface according to the diameter of said grinding wheel.

4,176,501

DEVICE FOR ATTACHING ON A SPECTACLE LENS A BLOCK FOR MOUNTING ON AN EDGING OR BEVELLING MACHINE

Pierre Bardonnet, Montgeron, and Jean-René Chamberaud, L'Isle Adan, both of France, assignors to Essilor International (Compagnie Generale d'Optique), Joinville le Pont, France

Filed Mar. 15, 1978, Ser. No. 886,635

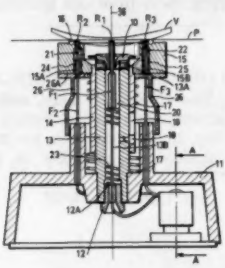
Claims priority, application France, Mar. 25, 1977, 77 08951

Int. Cl.² B24B *19/00, 13/00*

U.S. Cl. 51—277 **5 Claims**

1. A device for attaching, on a spectacle lens, a block for mounting on a lens edging or bevelling machine, comprising:

fixed mounting block holding means; lens holding means located substantially in one plane perpendicular to the axis of said block and lens holding means and movable between a centering position, in which the lens to be blocked is at a distance from the mounting block, and a blocking position for securing the mounting block on the lens; centering marks located substantially in said plane; said centering marks comprising luminous ends of optical fibers made of glass or plastic material, the end of each fiber being mounted in centering



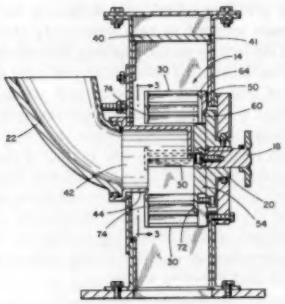
mark holding means, said centering mark holding means each comprising a holder for the end of each fiber and being movable in a direction substantially perpendicular to said plane in such a way that said centering marks are always in contact with the surface of a lens placed on said lens holding means, said surface being the surface adapted to subsequently receive the mounting block when in the blocking position; said lens holding means and centering mark holding means each being normally biased in said centering position.

4,176,502

SPACERLESS BLASTING WHEEL AND BLADE LOCKING ARRANGEMENT THEREFOR

Raymond M Leliaert, South Bend, Ind., assignor to Wheelabrator-Frye Inc., Hampton, N.H.

Filed Feb. 15, 1978, Ser. No. 877,878
Int. Cl.[2] B24C *5/06*
U.S. Cl. 51—434 **6 Claims**



1. A spacerless blasting wheel construction for rotation by a motor driven shaft comprising:

(a) a plurality of blades for projecting particulate, one end thereof being provided with a securing element thereon,

(b) means for engaging said shaft for rotation therewith,

(c) means for securing said blades to said shaft engaging means at said one end only, said blades maintained at a selected location and angular orientation by said securing means, said securing means including a front plate and a back plate, said plates being positioned on opposite sides of said one end of said blade to sandwich said one end therebetween, said front plate being secured to said shaft engaging means flush against said back plate, said back plate having a central recess and slots located at the outer periphery of said central recess into which said blade securing elements are received to prevent outward movement thereof,

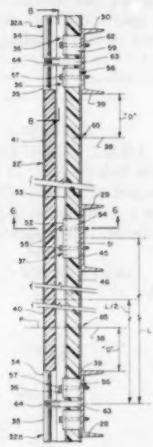
said blades rotating with said shaft to project particulate outwardly therefrom, the other end of said blades remaining unsecured.

4,176,503

CONTROLLED RELEASE WALL STRUCTURE

Raymond M. L. Ting, Pittsburgh, Pa., assignor to H. H. Robertson Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 828,922, Aug. 29, 1977, abandoned. This application Feb. 2, 1978, Ser. No. 874,536
Int. Cl.[2] E04C *1/00*
U.S. Cl. 52—1 **27 Claims**



1. In a controlled release wall structure, the combination comprising:

a building framework including a first frame member and spaced therefrom a second frame member;

a composite panel spanning the distance between the first and second frame members and having a panel end lapping said first frame member, said panel comprising an inner skin and an outer skin and a structural core disposed between and securing said inner skin to said outer skin in shear-transferring relation;

confinement means releasably retaining said panel end on said first frame member;

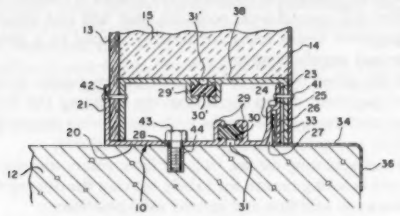
fastening means positively securing the said panel to said second frame member; and

said composite panel having a discontinuity positioned between the first and second frame members and formed in at least one surface of one skin along a line extending generally parallel with and spaced at a selected distance from a proximate edge of said first frame member, said discontinuity reducing the bending strength of said composite panel whereby said wall structure is adapted to disengage from said confinement means at an applied load determined by said selected distance and to collapse in the direction of said applied load, but remain positively connected to said second frame member.

4,176,504
WEATHER PROOF SANDWICH PANEL FLOOR ATTACHMENT DEVICE

Jack G. Huggins, R.D. #2, Box 415, Berlin, Camden County, N.J. 08009

Filed Aug. 21, 1978, Ser. No. 935,483
Int. Cl.[2] E04D *3/38*; E02D *27/00*
U.S. Cl. 52—61 **9 Claims**



1. A device for weather proof attachment of walls comprising sandwich panels of two facia sheets, one exterior and one interior sheet around a core which does not extend to the bottom of the facia sheets forming a cavity along the bottom edge of each panel, the attachment being to a floor base having at least one edge along the periphery of the base exposed to the weather comprising:

(a) a base bracket means extending along the length of the walls under the bottom edge of the sandwich panels comprising:

(1) a base horizontal member extending along the floor base under the bottom edge of the sandwich panels with a width extending from the outside surface of the interior facia sheet to a position under the cavity in the panel near the inside surface of the exterior facia sheet,

(2) an inside upright vertical rail along the length of the base member in a position and shape to extend upwardly along the outside surface of the interior facia sheet, and

(3) a groove means structurally connected to and extending along the length of the edge of the base member under and extending upwardly into the panel cavities, forming a vertical groove along the bottom of the bracket means,

(b) a protection sheet extending along the length of the bracket formed such that one edge engages in the groove means,

(c) a first attachment means structurally attaching the bracket means to the floor base, and

(d) a second attachment means structurally connecting the sandwich panels to the bracket means

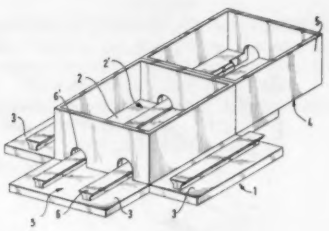
wherein one edge of the protection sheet is held in the groove means of the bracket, the intermediate portion of the sheet rests on the surface of the floor base and the outside edge of the protection sheet extends over and around the exterior exposed corner of the floor base.

4,176,505
CONNECTING ELEMENT

Artur Fischer, Weinhalde 34, D-7244 Waldachtal 3 (Tumlingen), Fed. Rep. of Germany

Filed Apr. 20, 1978, Ser. No. 898,135
Claims priority, application Fed. Rep. of Germany, Jun. 18, 1977, 7719132[U]
Int. Cl.[2] E04C *1/10*
U.S. Cl. 52—582 **8 Claims**

1. A connecting element for cruciformly connecting quadrangular structural elements each having a connecting surface, comprising a cruciform plate-like member including a central portion having lateral sides, and side portions each located at one of said lateral sides of said central portion, said central portion and said side portions having supporting surfaces arranged to support the connecting surfaces of the structural elements and provided with means for connecting the latter to said plate-like member, the supporting surface of said central portion having dimensions which are at least equal to the dimensions of the connecting surface of the structural element, whereas the supporting surface of each of the side portions has at least one dimension which is smaller than a corresponding dimension of the structural element so that,

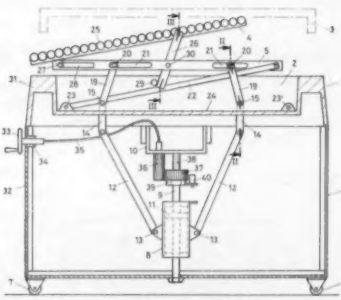


when one of the structural elements is connected to said central portion and other structural elements are connected to said side portions of said plate-like member, the structural elements are cruciformly arranged relative to one another, and a section of the connecting surface of each of said other structural elements projects beyond the respective side portion and thus remains free for connection with a further structural element.

4,176,506
VACUUM PACKING MACHINE WITH TILTABLE ROLLER STACKING PLATE

Bruno Landolt, Herisau, Switzerland, assignor to Inauen Maschinen AG, Herisau, Switzerland

Filed Jun. 19, 1978, Ser. No. 916,660
Int. Cl.[2] B65B *31/02*
U.S. Cl. 53—86 **5 Claims**



1. A vacuum packing machine including a vacuum chamber and a cover member for sealingly closing the chamber, characterized by:

(a) a generally planar stacking plate for carrying bagged products to be vacuum packed, and

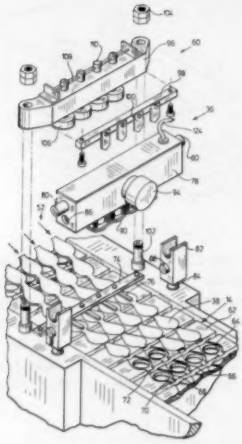
(b) means for raising the plate out of the vacuum chamber to discharge the products and for lowering the plate into the chamber to an adjustable depth, said means comprising a horizontally disposed frame, means for raising and lowering the frame into and out of the chamber and simultaneously horizontally displacing the frame, and means mounting the plate above and to the frame for pivotal and slidable movement relative thereto.

4,176,507

CONDIMENT PACKAGING MACHINE

Derek V. Mancini, Stouffville, Canada, assignor to Consumers Glass Company Limited, Toronto, Canada

Filed Apr. 3, 1978, Ser. No. 893,314
Int. Cl.[2] B65B 7/28
U.S. Cl. 53—478 **18 Claims**



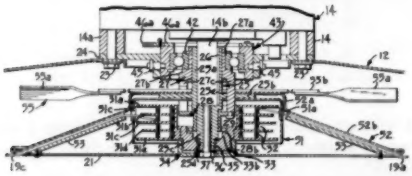
16. A process for heat sealing of an individual rimmed plastic container with the first lid of a thermo reactive series of like lids interconnected by severable tabs comprising the steps of supporting the container rim and momentarily halting its movement, aligning a lid above the container, clamping said series of lids, heat sealing such lid to such container by applying pressure and heat to such lid, severing such interconnecting tab of the sealed lid prior to resumed movement of the container and to unclamping said series of lids, and advancing another container with aligned lid in preparation for the heat sealing step, wherein the movement of the containers causes a responsive movement of said series of lids maintaining the alignment of said series of lids above said containers.

4,176,508

LINE FEED MECHANISM FOR FILAMENT MOWER

James R. Baumann, St. Louis Park; Robert C. Comer, Hopkins, and Jerome F. Yourczek, Minneapolis, all of Minn., assignors to The Toro Company, Minneapolis, Minn.

Filed Aug. 2, 1977, Ser. No. 821,145
Int. Cl.[2] A01G 3/06
U.S. Cl. 56—12.7 **16 Claims**



1. In a vegetation cutting device in which a flexible filament is rotatably driven about a substantially vertical axis with a free end of the filament defining a cutting plane, apparatus for metering discrete lengths of the filament comprising:

(a) drive shaft means rotatably driven about said axis;

(b) spool means upon which flexible filament may be wound, the spool means being carried by the shaft means for rotational movement relative thereto and in an axially stationary position thereon;

(c) driving means mounted for rotation with the shaft means and axially movable relative thereto between first and second axial positions;

(d) indexing means mounted for rotation with said shaft means and associated with said driving means to cause said driving means to shift axially in response to axial movements thereof;

(e) driven means mounted for rotation with the spool means;

(f) one of said driving and driven means including first and second engageable means axially spaced in relation to said first and second axial positions, said first and second engageable means being rotationally spaced by a predetermined angular amount;

(g) the other of said driving and driven means including engagement means for selectively engaging the first and second engageable means with the driving means in said first and second axial positions, respectively;

(h) and actuating means, isolated from rotary movement of said indexing means, for axially moving the driving means between said first and second axial positions;

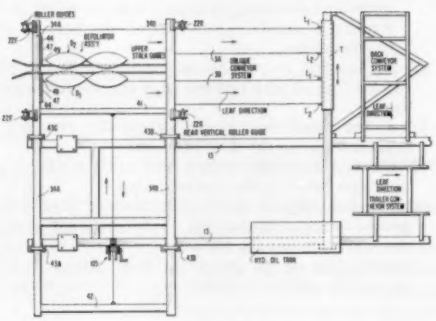
(i) the engageable and engagement means being so constructed that the driving and driven means are in rotatable driving engagement with the driving means in either axial position, and movement of the driving means from axial position to the other causes the driven means to rotate relative to the driving means in an amount corresponding to said predetermined angular amount, and in a direction permitting filament to unwind from the spool means in said discrete amount.

4,176,509

LATERALLY ADJUSTABLE TOBACCO COMBINE

Henry Griner; Wade Griner; Claude Hyars, and Tommy Sweat, all of Patterson, Ga., assignors to G S & H Equipment Corporation, Patterson, Ga.

Continuation-in-part of Ser. No. 503,676, Sep. 6, 1974, Pat. No. 4,035,998. This application Jul. 15, 1977, Ser. No. 816,120
Int. Cl.[2] A01D 45/16
U.S. Cl. 56—27.5 **9 Claims**



1. In a tobacco combine having a first frame assembly on a mobile unit, a second frame assembly mounted on said first frame assembly and extending transversely to the intended direction of forward travel of said mobile unit, said second frame assembly having portions extending above the ground to each side of said mobile unit in cantelever fashion and a tobacco leaf defoliator frame assembly mounted for vertical adjustment on said second frame assembly and to one side of said mobile unit, and a defoliation unit on said tobacco leaf defoliation frame assembly, the improvement comprising:

means releasably mounting said second frame assembly on said first frame assembly to permit adjustment of said second frame assembly relative to said direction of travel, and independently of the vertical adjustment of said tobacco leaf defoliator frame assembly,

power means between said first and said second frame as-

semblies for effecting said lateral movements of said second frame assembly relative to said direction of travel, and clamp means for clamping said second frame assembly to said first frame assembly after said lateral adjustment thereof.

4,176,510

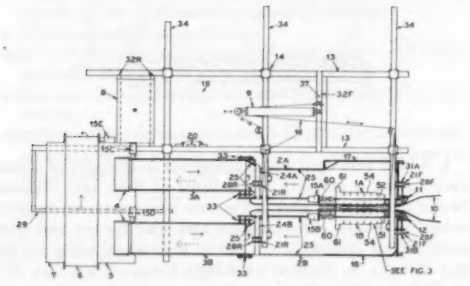
TOBACCO COMBINE HYDRAULIC MOTOR SYSTEM

Henry Griner; Wade Griner; Claude Hyars, and Tommy Sweat, all of Patterson, Ga., assignors to G S & H Equipment Corporation, Patterson, Ga.

Continuation-in-part of Ser. No. 503,676, Sep. 6, 1974, Pat. No. 4,035,998. This application Jul. 15, 1977, Ser. No. 816,125

Int. Cl.[2] A01D *45/16*

U.S. Cl. 56—27.5 **1 Claim**



1. In a tobacco combine for defoliation and subsequent transportation of tobacco leaves, said combine having a pair of hydraulic defoliation motors driving a pair of contrarotating tobacco leaf defoliating means, a pair of hydraulically driven conveyors, one to each side of said pair of contrarotating tobacco leaf defoliating means, each said conveyor conveying said defoliated leaves to a common point, and a hydraulically driven common conveyor for moving tobacco leaves transverse to the direction of conveying of defoliated leaves by said pair of hydraulically driven conveyors, for receiving leaves from each said pair of conveyors are removing the defoliating leaves to a common collection point,

improvement in the hydraulic system for driving said defoliators and said conveyors comprising:

a single hydraulic pump,

said hydraulic motors driving each of said defoliating means in contra-rotating directions for defoliating the leaves of tobacco plants, means constituting hydraulic fluid flow paths connecting said hydraulic defoliator motors in a series hydraulic circuit with said single hydraulic pump,

a hydraulic conveyor motor for each of said pair of hydraulically driven conveyors, respectively,

a **50—50** flow divider connected to receive the hydraulic fluid flow from said single hydraulic pump and provide equal hydraulic fluid flow in a pair of further hydraulic fluid flow paths, one each of said pair of hydraulic flow paths coupled to each said hydraulic conveyor motor, respectively, for each of said conveyors, means for combining the hydraulic fluid flow from said last named hydraulic conveyor motors,

a further hydraulic motor for driving said common conveyor, and means constituting a further hydraulic fluid flow path for connecting said further hydraulic motor between said means for combining and said pump so that said further hydraulic motor is driven by the combined flow of hydraulic fluid from the pair of hydraulic conveyor motors,

said first pair conveyor means each including a horizontal run of a single conveyor run adjacent and below the said defoliator means, and an oblique conveyor run, both said horizontal single conveyor run and said oblique run being articulated to one another and commonly driven by the same hydraulic motor, with the obliqueness of said oblique conveyor run relative to the horizontal being a function of the height of said defoliator unit above ground.

4,176,511

CONVEYOR SYSTEM FOR A HARVESTER

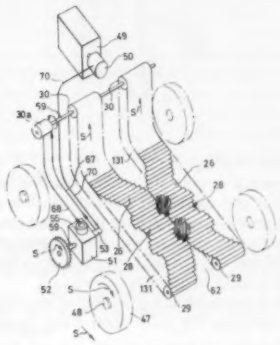
Roy Scudder, Marden, and Alan Bowes, Ulcombe, both of England, assignors to FMC Corporation, San Jose, Calif.

Filed Jul. 6, 1977, Ser. No. 813,400

Claims priority, application United Kingdom, Jul. 6, 1976, 28098/76; Sep. 2, 1976, 36436/76

Int. Cl.[2] A01D *46/00*

U.S. Cl. 56—330 **4 Claims**



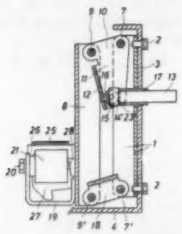
1. In a harvesting machine for harvesting crops growing on plants such as trees, bushes, canes, vines or the like, having stalks growing from the ground, said harvester having frame means, means for advancing the harvester in a direction along a row of said stalks, means on said frame means for dislodging crop from the plants, endless conveyor means on said frame means having laterally spaced endless flexible side conveyors which straddle the crop along a crop receiving reach, means for driving said conveyors for moving said reach in a conveying direction opposite to the advance direction of said harvester and at zero speed relative to the ground, a row of individual crop catching and conveying trays mounted on each of said side conveyors, means for resiliently urging said trays laterally of the conveying direction of the conveying reach of the conveyor means toward the row of stalks, cam means for retracting the trays at the front of the harvester for initially clearing stalks and for releasing the trays for resiliently engaging and surrounding the stalks as the harvester advances; the improvement wherein said side conveyors, each having laterally spaced flexible inside and outside members, longitudinally spaced rods interconnecting the flexible members of each side conveyor, means for mounting said trays on said rods for laterally slidable non-rotating motion with said trays disposed in a longitudinal row at each side of the longitudinal axis of said harvester, said trays each having smooth side edges that are substantially contiguous to the side edges of adjacent trays for forming a continuous crop catching and conveying surface, said resilient means urging said trays to slide laterally inwardly along said rods to bring the inner ends of the trays of one row into substantially end to end relation with the trays of the other row at substantially the longitudinal axis of the harvester, said resilient means accommodating termination of the sliding action of said trays when their inner ends encounter the lateral sides of the stalks of the crop as the harvester advances, said resilient means causing the trays on the front and rear sides of a stalk to be brought into substantially end to end relation for forming a continuous crop catching reach around the stalk.

4,176,512

ROTOR BRAKING APPARATUS AT EACH SPINNING UNIT OF AN OPEN-END SPINNING MACHINE

Peter Schwengeler, Winterthur, Switzerland, assignor to Rieter Machine Works Ltd., Winterthur, Switzerland

Continuation of Ser. No. 823,874, Aug. 11, 1977, abandoned.
This application Jun. 26, 1978, Ser. No. 919,043
Claims priority, application Switzerland, Aug. 26, 1976, 10823/76
Int. Cl.[2] D01H 7/22
U.S. Cl. 57—88 10 Claims



1. In a rotor braking apparatus provided at each spinning unit of an open-end spinning machine, wherein each such rotor spinning unit is provided with a rotor which is movable from an operating position away from a drive belt into an idle position for stopping the rotor, in which idle position a shaft of the rotor is contacted by a brake lever having a brake shoe, the improvement which comprises:

an additional mechanism for activating the rotor brake shoe without moving the rotor shaft from its operating position;

said additional mechanism comprising:

a machine frame;

a rigid support member mounted on said machine frame;

a movable member movably connected with said rigid support member mounted on said machine frame;

a working member connected with said movable member; and

a device for urging said movable member into an operative position for effecting disengagement of a drive connection for the rotor and engagement of the brake lever for initiating a braking action of the rotor.

10. In a rotor braking apparatus provided at each spinning unit of an open-end spinning machine, wherein each such rotor spinning unit is provided with a rotor which is pivotable from an operating position away from a drive belt into an idle position for stopping the rotor, in which idle position a shaft of the rotor is contacted by a brake lever having a brake shoe, the improvement which comprises:

an additional mechanism for activating the rotor brake shoe without pivoting the rotor shaft from its operating position;

said additional mechanism comprising:

a working member provided with an extension;

a rotatably supported idler roll carried by said working member;

a pivoting member having at least one shaft and connected with said working member;

a rigid support member having at least one shaft;

a machine frame having a wall;

an intermediate member including a plate and pivotably mounted on said one shaft of the pivoting member and said one shaft of the rigid support member;

said pivoting member being mounted on the machine frame via the intermediate member;

said pivoting member being pivotable about said rigid support member;

a restarting device for exerting a pressure force onto said plate of the intermediate member;

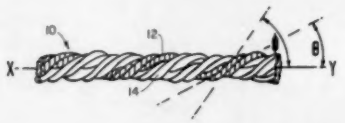
a plunger slidably mounted at said rigid support member and said wall of the machine frame for transmitting said pressure force exerted by said restarting device onto said plate of the intermediate member, said pressure force effecting the pivotal movement of the pivoting member.

4,176,513

STEEL WIRE CORD

Maurice A. Young, Sutton Coldfield, England, and Leonhard W. Hamacher, Bruchköbel-Niederissigheim, Fed. Rep. of Germany, assignors to Dunlop Limited, London, England

Filed Sep. 1, 1977, Ser. No. 829,976
Claims priority, application United Kingdom, Sep. 7, 1976, 36917/76
Int. Cl.[2] D02G 3/48; D07B 1/06
U.S. Cl. 57—237 13 Claims



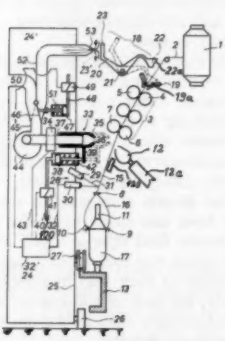
1. A steel wire cord which comprises an assembly of strands each having a plurality of filaments of steel, said filaments having been drawn, after at least one heat treatment, to give a reduction in their cross-sectional area after the last heat treatment, of less than 96%, the strand helix angle being not less than 20° and the filament helix angle being not less than 40°.

4,176,514

METHOD OF CONTROLLING THE OPERATING CONDITIONS OF A RING SPINNING MACHINE AND APPARATUS FOR IMPLEMENTING THE METHOD

Herbert Stalder, Kollbrunn, Switzerland, assignor to Rieter Machine Works Ltd., Winterthur, Switzerland

Filed Apr. 24, 1978, Ser. No. 899,220
Claims priority, application Switzerland, May 11, 1977, 5882/77
Int. Cl.[2] D01H 15/00, 11/00, 13/16
U.S. Cl. 57—261 16 Claims



1. A method of consecutively controlling the operating conditions at a plurality of spinning positions of a ring spinning machine having a suction system, each spinning position having a drafting arrangement containing rolls and supplied with fiber material, a yarn being formed at each spinning position of the ring spinning machine, comprising the steps of:

detecting yarn breakages at each of the spinning positions and lap-up formations on the rolls of the drafting arrangement of each spinning position;

upon detection of a yarn breakage at a predetermined spinning position, deflecting the suction air stream of the

suction system at such predetermined spinning position of the ring spinning machine; and

checking said deflected suction air stream for the presence of a fiber stream.

8. A control apparatus for consecutively controlling the operating conditions at a plurality of spinning positions each having a spindle of a ring spinning machine, each spinning position containing a yarn suction device and a drafting arrangement including a pair of cooperating infeed rolls and a pair of cooperating delivery rolls for drafting fiber material which is formed into a yarn, comprising:

said control apparatus embodying means enabling said control apparatus to travel from spinning position to spinning position along the ring spinning machine;

a yarn detector for detecting the presence of the yarn between the delivery rolls of the drafting arrangement and a spindle of the corresponding spinning position;

a fiber stream-deflecting device;

said yarn detector activating said fiber stream-deflecting device in the event of yarn breakage;

a fiber detector cooperating with said fiber stream-deflecting device;

said fiber stream-deflecting device taking-up the fiber stream acted on by the suction air stream of the suction system and transferring it to said fiber detector.

4,176,515
ELECTRONIC CLOCK, PARTICULARLY A QUARTZ CLOCK

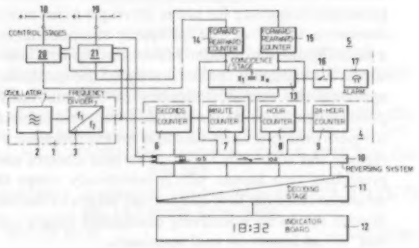
Manfred Stein, Eschborn, and Dieter Busch, Rosbach, both of Fed. Rep. of Germany, assignors to Quarz-Zeit AG, Frankfurt am Main, Fed. Rep. of Germany

Filed Oct. 5, 1977, Ser. No. 839,615

Claims priority, application Fed. Rep. of Germany, Oct. 9, 1976, 2645744

Int. Cl.[2] G04C *21/16*

U.S. Cl. 58—19 R **3 Claims**



1. An electronic clock, particularly a quartz clock, comprising

a timer transmitting stage means for providing timing count pulses,

an indicator system connected to said timer transmitting stage means, said indicator system including at least a minute counter and an hour counter as well as a decoding stage operatively connected to said counters and a digital indicator board connected to said decoding stage, and

an alarm system including at least a presettable counter associated with minutes and a presettable counter associated with hours, as well as a coincidence stage means.

each of said presettable counters having an output operatively lockable on said indicator system,

said coincidence stage means for comparing output signals of said counters of said indicator system with output signals of said presettable counters of said alarm system, respectively,

each of said presettable counters of said alarm system constitutes a forward-rearward-counter, and

a plurality of switch means for selecting the direction of counting of said forward-rearward-counters, respectively,

each said switch means comprises a rocker type push-button switch, one said rocker type push-button switch is operatively coordinated to each of said forward-rearward-counters, respectively,

a control stage in integrated construction connected between one of said switch means and said forward-rearward-counters, respectively,

said control stage comprises,

a first anticoincidence member having two first inputs and a first output, one of said first inputs is connected with said one of said switch means,

a resistor connected across said first inputs,

a second anticoincidence member having two second inputs and a second output, one of said second inputs of said second anticoincidence member is connected to said first output of said first anticoincidence member,

one of said forward-rearward-counters has a reversing input connected to said second output of said second anticoincidence member and a count input connected to one of said second inputs of said second anticoincidence member,

the other of said first inputs and the other of said second inputs of said anticoincidence members are connected to said timer transmitting stage means and are applied with the timing count pulses.

4,176,516
ARRANGEMENT FOR PUTTING AN ELECTRONIC TIMEPIECE RIGHT WITH MINUTE INDICATION ADVANCED AT FIRST

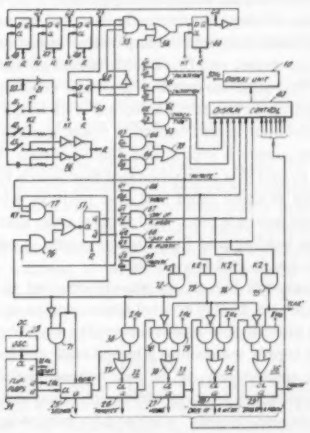
Yukuo Kodama, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 694,967, Jun. 11, 1976, abandoned. This application Feb. 16, 1978, Ser. No. 878,394

Claims priority, application Japan, Jun. 13, 1975, 50-71757; Sep. 27, 1975, 50-1166773

Int. Cl.[2] G04C *3/00*

U.S. Cl. 58—23 R **12 Claims**



1. An arrangement for correcting the indication of an electronic timepiece comprising:

a clock generator generating clock pulses;

first counter means for counting, when put into operation, first input pulses from zero to a predetermined integer in each "minute" to produce first output signals, said first counter means being put, when held in a reset state, in a state of counting zero;

first pulse supply means operatively coupled to said clock generator and responsive to said clock pulses for supplying said first input pulses to said first counter means;

second counter means for counting second input pulses to produce second output signals representative of "minutes" of the indication;

pulse producing means operatively coupled to said clock generator responsive to said clock pulses for producing output pulses of a period of about one "second";

second pulse supply means for supplying, when put in its normal state while said first counter means is kept in operation, said first output signals once in every "minute" to said second counter means as said second input pulses no second input pulses when put in a normal state while said first counter means is in a reset state, and no first output signals when put in a biased state;

third counter means for counting third input pulses to produce third output signals representative of the "hours" of the indication;

third pulse supply means for supplying to said third counter means as said third input pulses said second output signals once every "hour" when put in a normal state, said output pulses when put in a biased state, and none of said second output signals and said output pulses when put in a disabled state;

a display unit;

a first switch manually operable into a selected one of a display and a rest position; and

display control means operatively coupled to said first switch, to said display unit, and to at least said second and third counter means and cyclically put in a plurality of states when said first switch is put into said display position, said plurality of states comprising a sequence of an indication state, a "minute" state, and an "hour" state, said display control means making said display unit display the indication when put in said "minute" state, and at least the "hours" of the indication when put in said "hour" state;

said arrangement comprising;

a second switch manually operable into a selected one of an operative and an inoperative position;

first control means operatively coupled to said first and second switches, said display control means, and said first counter means, said first control means normally being put in a first state for putting said first counter means into operation, switched to a second state when said second switch is put in said operative position while said display control means is kept in said "minute" state, and switched back to said first state when said first switch is put into said display position from said rest position while said first control means is put in said second state, said first control means holding said first counter means in said reset state when put in said second state;

second control means operatively coupled to said second switch, said display control means, and to said second and third pulse supply means for putting said second and third pulse supply means into a biased state and into a disabled state, respectively, when said second switch is put into said operative position while said display control means is kept in said "minute" state and for otherwise leaving said second pulse supply means in its normal state and said third pulse supply means in either of said normal and biased states; and

adjusting means operatively coupled to said first switch, said display control means, and to said first control means for keeping said display control means in said "minute" state even when said first switch is put into said display position from said rest position at least once after said first control means is switched to said second state for the first time after said display control means in put into said "minute" state.

4,176,517

INTEGRATED CIRCUIT FOR TIMEPIECE

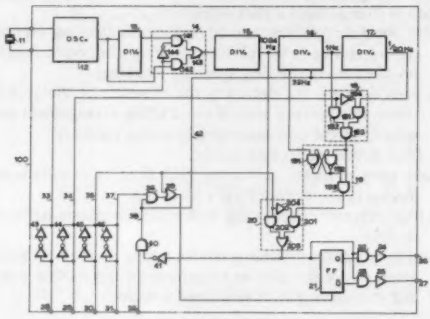
Makoto Yoshida, Tokorozawa, Japan, assignor to Citizen Watch Co. Ltd., Tokyo, Japan

Continuation of Ser. No. 617,487, Sep. 29, 1975, abandoned. This application Jul. 22, 1977, Ser. No. 818,014

Claims priority, application Japan, Sep. 30, 1974, 49-112591

Int. Cl.[2] G04C *3/00*; G04B *19/30*

U.S. Cl. 58—23 R **12 Claims**



1. A single integrated circuit for use in alternative assembly of a plurality of types of electronic timepieces, said integrated circuit comprising:

a set of first electronic components providing basic functions which are common to the operation of each type of timepiece,

a set of second electronic components providing basic functions, those functions common to the operation of at least one but not all of the plurality of types of timepieces,

a control for operating selected ones of said second electronic components to thereby match said circuit to a selected type of timepiece including an oscillator having an output frequency for use in driving a pulse motor of the timepiece, the set of first electronic components including a main frequency divider means having first and second stages for reducing the frequency of the oscillator before applying the output frequency of the osci-lator to the pulse motor; reset means included with said control circuit for performing a reset function on the frequency divider means; and terminals included in said control circuit for providing two inputs which selectively cause the reset means to reset the first and second stages of the frequency divider means by selectively combining binary values "1" and "0" as inputs on said terminals.

4,176,518

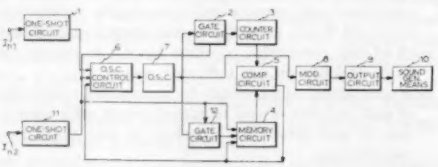
ELECTRONIC CLOCK HAVING AUDIBLE TIME INDICATION

Hakuhei Kawakami; Takeshi Ishihara, both of Neyagawa, and Kenzo Hatada, Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jul. 8, 1977, Ser. No. 814,085

Int. Cl.[2] G04C *21/12*; G08B *8/00*

U.S. Cl. 58—38 R **7 Claims**



1. An electronic time indicating signal clock comprising:

a time indicating means for indicating the time;
a time measuring means connected to said time indicating means for causing said time indicating means to indicate the time;
a detecting means associated with said time indicating means for detecting when said time indicating means indicates a particular periodic time for which it is desired to generate an audio time indicating signal;
a pulse oscillation means for generating pulses;
a pulse oscillator control means connected to said detecting means and said pulse oscillator means for causing said pulse oscillator means to repetitively generate pulses whenever said detecting means detects one of said particular periodic times until said pulse oscillator control means is reset;
a time indicating signal generating means connected to said pulse oscillator means for generating a time indicating signal whenever said pulse oscillator means generates a pulse;
a counting means connected to said pulse oscillator means for counting the number of pulses generated by said pulse oscillator means;
a memory means for storing the number of time indicating signals desired to be produced;
a comparison means connected to said counting means, said memory means and said pulse oscillator control means, for comparing the count of said counting means with the number stored in said memory means, for resetting said pulse oscillator control means when the count of said counting means equals the number stored in said memory means and for storing in said memory means the number of time indicating signals desired to be produced at the next occurring particular time period; and
a correction means connected to said memory means and said pulse oscillator control means, including a correction switch for activating said pulse oscillator control means to cause said pulse oscillator means to generate pulses, for correcting the number stored in said memory means by storing a number in said memory means related to the number of pulses generated by said pulse oscillator circuit during the activation of said correction switch.

4,176,519

GAS TURBINE HAVING A CERAMIC ROTOR

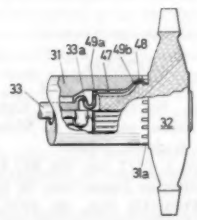
Sven O. Kronogård, Lomma, Sweden, assignor to United Turbine AB & Co., Kommanditbolag, Malmo, Sweden

Division of Ser. No. 638,052, Dec. 5, 1975, Pat. No. 4,064,690, which is a continuation-in-part of Ser. No. 471,176, May 17, 1974, Pat. No. 3,943,703. This application Oct. 4, 1977, Ser. No. 839,273

Claims priority, application Sweden, May 22, 1973, 07153/73

Int. Cl.[2] F01D *5/28, 5/30*

U.S. Cl. 60—39.16 R **2 Claims**



1. In a gas turbine power plant comprising a compressor, a first turbine rotor mounted upon the same shaft as, and imparting rotary movement to said compressor, at least one further turbine rotor mounted upon a shaft separate from that of said first turbine rotor and compressor combination, and at least one combustion chamber having fuel supply means, receiving air from the compressor and supplying combustion gas to said first and at least one further turbine rotor, the improvement of said shaft mounting said first turbine rotor and said compressor, being hollow, said first turbine rotor being manufactured of ceramic material and being provided with an integral shaft stub, to be introduced into said hollow shaft, means including a resilient clamping member and a tightening rod for engagement with said stub shaft, and mating, interengaging means on said stub shaft and said clamping member, for preventing relative rotation during torque transfer wherein said rotation preventing means include corrugations at said clamping member, running substantially axially, and mating grooves in said stub shaft.

4,176,520

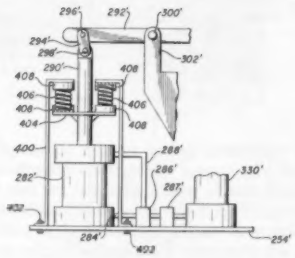
DRIVE SYSTEM FOR DEEP WELL PUMP

James B. Horton, P.O. Box 1758, Kilgore, Tex. 75662

Filed Feb. 27, 1978, Ser. No. 881,757

Int. Cl.[2] F15B *11/15*

U.S. Cl. 60—369 **1 Claim**



1. A drive system for driving the pump rod of a deep well pump, comprising:
a lift cylinder having a piston movable therein, said piston being connected to the pump rod of the well pump;
a motor having a piston slidable within a cylinder, the motor piston dividing the cylinder into a chamber above and below the piston, with one chamber of the cylinder in fluid communication with the chamber of the lift cylinder below the lift cylinder piston;
means for reciprocating said motor piston to direct fluid from said one chamber of said motor to said lift cylinder to raise said lift cylinder piston, thereby driving the pump rod of the well pump upwardly; and
spring means mounted for compression under the action of the reciprocating means when said reciprocating means is actuated to move the motor cylinder piston in a direction to allow the lift cylinder piston to move downwardly in the lift cylinder, and for extension when the reciprocating means is actuated to move the motor cylinder piston to actuate the lift cylinder piston to move the pump rod of the well pump upwardly.

4,176,521

LOAD RESPONSIVE FLUID CONTROL VALVES

Tadeusz Budzich, 80 Murwood Dr., Moreland Hills, Ohio 44022

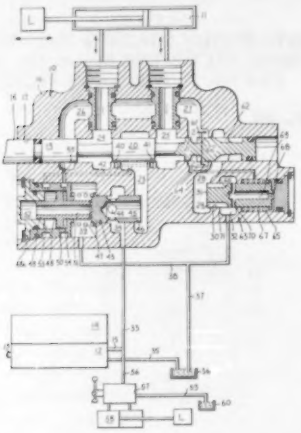
Division of Ser. No. 731,367, Dec. 6, 1976, Pat. No. 4,112,679. This application Apr. 24, 1978, Ser. No. 899,510

Int. Cl.[2] F16H *39/46*

U.S. Cl. 60—445 **3 Claims**

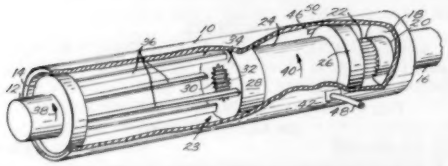
1. A load responsive control system comprising a combination of
(a) a variable delivery fluid pump;
(b) a discharge pressure compensator for varying pump delivery rate in inverse relation to discharge pressure to thereby limit that pressure to a predetermined maximum value;
(c) a multiplicity of fluid motors;

(d) a fluid reservoir;
(e) fluid distributing means between the pump and each motor including a closed center distributing valve capable of throttling fluid for selectively directing discharge fluid from the pump to a motor and exhaust fluid from the motor to the reservoir;
(f) means effective when a number of distributing valves are throttling the exhaust fluid from the motors and discharge pressure is below said maximum predetermined value to vary pump delivery rate to maintain the fluid pressure of exhaust fluid of the motor subjected to highest load at the distributing valve controlling the operation of this motor at a constant preselected level;



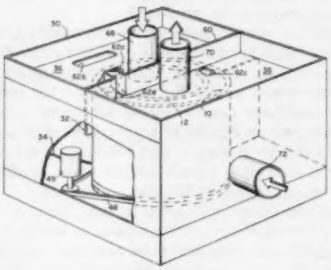
(g) means effective when a number of motors are being operated simultaneously and a distributing valve is controlling the operation of a fluid motor with a smaller load, to vary resistance to fluid flow between the pump and the motor, to maintain fluid pressure of exhaust fluid at the distributing valve at a constant preselected level;
(h) means effective when all the distributing valves are closed for varying pump delivery rate in inverse relation to discharge pressure to thereby maintain said pressure at a level substantially lower than said maximum predetermined value.

4,176,522
TORQUE MONITOR
Mark T. Holtzapple, 8920 Normandale Blvd., Bloomington, Minn. 55437; Robert L. Wehe, Ithaca, N.Y.; Charles G. Myer, Minneapolis, Minn., and William W. Carson, Mendon, Mass., assignors to Mark Holtzapple, Philadelphia, Pa.
Filed Jan. 20, 1978, Ser. No. 871,004
Int. Cl.[2] F15B *15/18*
U.S. Cl. 60—459 **9 Claims**



1. A fluid control apparatus comprising a drive means, a driven means, coupling means for transmitting torque from said drive means to said driven means,
a housing for said coupling means, means for supplying fluid to said housing and means for passing fluid from said housing, said coupling means being movable in said housing between an actuated and a de-actuated position in response to said drive means delivering torque through said coupling means to said driven means, said means for supplying fluid and said means for passing fluid being fixed relative to said housing so that said coupling means is movable relative to said means for supplying fluid and said means for passing fluid, said coupling means including means for controlling the passage of fluid through said housing as said coupling means is moved between said actuated and de-actuated positions, said means for controlling including a shoulder member carried by said coupling means and movable therewith to block at least one of said means for supplying fluid and means for passing fluid.

4,176,523
ADSORPTION AIR CONDITIONER
Jean L. I. Rousseau, Redondo Beach, Calif., assignor to The Garrett Corporation, Los Angeles, Calif.
Filed Feb. 17, 1978, Ser. No. 879,014
Int. Cl.[2] F25B *27/00*
U.S. Cl. 62—2 **36 Claims**

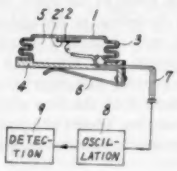


1. An air conditioning system for providing temperature controlled air to a conditioned space, said system comprising:
a desiccant bed having a generally cylindrical configuration and a first radial dimension;
regenerator means having a substantially cylindrical configuration and second radial dimension different from said first radial dimension;
means for mounting said desiccant bed and said regenerator means in a generally concentric orientation;
means for directing a first air flow through said desiccant bed and said regenerator means for controlling said conditioned space temperature;
means for directing a second air flow through said regenerator means and said desiccant bed for desorbing said desiccant bed; and
means for substantially isolating said first and second air flows.

4,176,524
FROST DETECTOR
Toshibumi Kamiyama, Neyagawa, and Kunito Miyamoto, Hirakata, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed Nov. 2, 1977, Ser. No. 847,814
Claims priority, application Japan, Nov. 10, 1976, 51/136081; Nov. 10, 1976, 51/151933[U]; Nov. 10, 1976, 51/151934[U]; Nov. 10, 1976, 51/151935[U]; Dec. 10, 1976, 51/166451[U]
Int. Cl.[2] G08B *21/00*; F25D *21/02*
U.S. Cl. 62—140 **9 Claims**

1. A frost detector comprising a piezoelectric element for connection as part of an oscillator circuit, a metal diaphragm to which said piezoelectric element is secured inside an air-tight space formed in part by the diaphragm, a base with a securing means and a resilient and heat conductive bellows connecting said diaphragm to said base and completing enclosure of the

air-tight space, said diaphragm and said base being made of heat conducting material and said base including securing means for securing it in a heat-conductive manner to a cooling point.

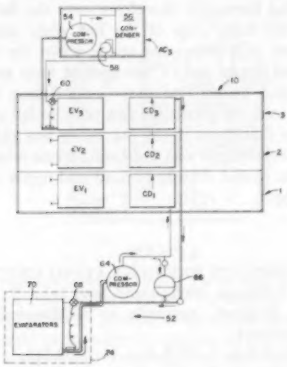


4,176,525

COMBINED ENVIRONMENTAL AND REFRIGERATION SYSTEM

James M. Tucker; Roger W. Dougan, and Jackob Swartzon, all of San Antonio, Tex., assignors to Wylain, Inc., Dallas, Tex.

Filed Dec. 21, 1977, Ser. No. 862,968
Int. Cl.[2] F25B *27/02, 29/00;* **F25D** *17/00;* **F25B** *7/00*
U.S. Cl. 62—238 R **17 Claims**



1. An environmental and refrigeration system for supplying conditioned air to a conditioned space comprising:

a condenser connected to a refrigeration system for condensing a refrigeration system working fluid, said condenser having a main section and a sub-cooler section connected together in continuous series flow, the refrigeration system working fluid adapted to pass through said main section and then through said sub-cooler section;

an evaporator connected to an air conditioning system for evaporating an air conditioning system working fluid;

first air flow controlling means for selectively passing a flow of space air from a conditioned space over at least a portion of said main section and/or over said evaporator and for passing outside air from the environment over said sub-cooler;

second air flow controlling means for selectively passing air from said condenser to said conditioned space or said environment;

said first air flow controlling means configured, when said environmental and refrigeration system is in a heating mode, to pass space air over at least a portion of said main section to thereby heat the space air with heat reclaimed from said refrigeration system and to pass outside air over said sub-cooler section to sub-cool said refrigeration system working fluid; and

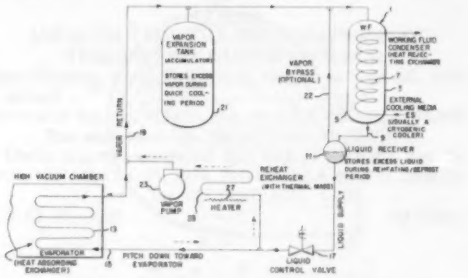
said second air flow controlling means configured, when said environmental and refrigeration system is in the heating mode, to return the heated space air from said main section to the conditioned space, and to return the outside air from said sub-cooler to the environment.

4,176,526

REFRIGERATION SYSTEM HAVING QUICK DEFROST AND RE-COOL

Dale J. Missimer, San Anselmo, Calif., assignor to Polycold Systems, Inc., San Rafael, Calif.

Continuation-in-part of Ser. No. 800,075, May 24, 1977, abandoned. This application Sep. 22, 1978, Ser. No. 944,961
Int. Cl.[2] F25B *47/00, 19/00*
U.S. Cl. 62—278 **18 Claims**



1. In a refrigeration system having condenser means for cooling and condensing a refrigerant vapor to the liquid phase, an evaporator unit for receiving a flow of said liquid condensate to be cooled thereby and upon which ice forms by condensation of humidity in the surrounding space or atmosphere and from which the refrigerant normally returns to the condenser means in its vapor phase,

a storage tank comprising a source for the refrigerant vapor connected to the condenser means, means for quickly defrosting the evaporator unit comprising:

means for terminating flow of said cooled liquid condensate from the condenser means to the evaporator unit without terminating operation of said condenser means,

a thermal storage unit,

a vapor pump connected directly to the evaporator unit for circulating only the fluid therein in heat exchange relation with said thermal storage unit for reheating and vaporizing the fluid therein to quickly warm the evaporator unit, said thermal storage unit being continuously heated during the defrosting and cooling operations of the evaporator unit.

4,176,527

ICE CRUSHER FOR REFRIGERATOR

William J. Linstromberg, and Robert F. Hartman, both of Evansville, Ind., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Jul. 13, 1978, Ser. No. 924,378
Int. Cl.[2] F25C *5/02*
U.S. Cl. 62—320 **19 Claims**

19. In a refrigeration apparatus having an ice storage receptacle and an ice delivery area spaced from said receptacle, an ice delivery apparatus for selectively delivering ice from said receptacle to said delivery area in either uncrushed or crushed form, comprising:

a housing positioned between said receptacle and said delivery area, having an inlet for receiving ice from said receptacle and an outlet in communication with said delivery area;

a shaft mounted for rotation within said housing;

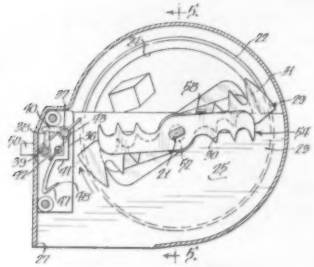
drive means connected to said shaft for selectively causing rotation thereof;

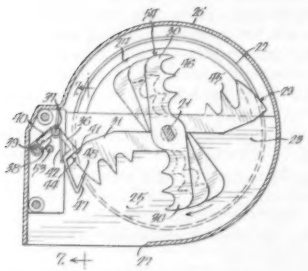
a first set of crusher arms fixed to said shaft for rotation therewith, each of said arms comprising a pair of opposed, radially extending blades having teeth extending in the

direction of rotation, said crusher arms being disposed within said housing so as to intercept ice bodies entering said housing from said inlet and carry the ice bodies to said outlet;

a second set of crusher arms disposed about said shaft interleaved and coaxial with said first crusher arms, each of said second crusher arms comprising a pair of opposed, radially extending blades having teeth extending in the opposite direction of rotation;

frictional coupling means disposed about said shaft for releasably coupling said second crusher arms to said shaft for rotation therewith, said coupling means including





alignment means for causing said second crusher arms to rotate in substantial alignment with said first crusher arms; and,

a selectively movable stop disposed in proximity to said second crusher arms and movable between a first position in which said second crusher arms are permitted to rotate to thereby permit delivery of uncrushed ice bodies to said delivery area and a second position in which said stop contacts said second crusher arms to prevent rotation thereof to thereby cause ice bodies to be crushed between said first and second crusher arms prior to delivery to said delivery area.

4,176,528

CONVEYOR BELT FOR ICE DISPENSER

Edwin H. Frohbieter, Stevensville, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Jul. 7, 1978, Ser. No. 922,672

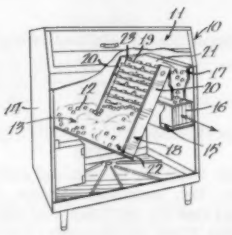
Int. Cl.[2] F25C *5/18*

U.S. Cl. 62—344 **13 Claims**

1. In an ice body maker having means defining an ice body collecting space, means for making ice bodies and delivering the ice bodies to said collecting space, and means defining an ice body dispensing space adapted to receive a removable ice body receiver, the improvement comprising:

a continuous flexible belt defined by a plurality of link plates articulated by cooperating knuckles and each having a front edge and a rear edge, first ice body engaging cleats at said front edge extending forwardly at an angle of less than 90° to the plane of the plate, and second ice body engaging cleats at said rear edge and extending at an angle to the plane of said link plate greater than the angle of said first cleats to the plane of the plate; and

means for driving the belt in an upright loop having a lower end disposed in said collecting space and an upper end disposed superjacent said dispensing space, the second cleats of each preceding link plate being disposed in interdigitated alignment with the first cleats of the following link plate whereby ice bodies are picked up on said first and second cleats as the belt moves upwardly through said



collecting space, the ice bodies picked up on said second cleats sliding forwardly therefrom over the link plate to fall over the front edge of the link plate substantially directly into said dispensing space when the link plate reaches said upper end of the upright loop and the ice bodies picked up on said first cleats sliding forwardly therefrom over the preceding link plate to fall against the back of the first cleats of the preceding link plate and be deflected thereby into said dispensing space when the link plate moves to and slightly beyond said upper end of the upright loop.

4,176,529

ABSORPTION REFRIGERATING UNIT

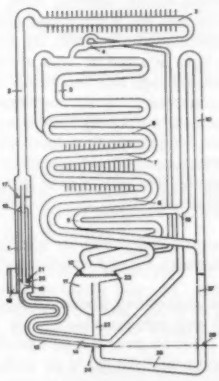
Hans Stierlin, Schlieren, Switzerland, and John R. Ferguson, Grove Hill, England, assignors to Kühlapparate GmbH SIBIR, Switzerland

Filed Sep. 5, 1978, Ser. No. 939,218

Claims priority, application Switzerland, Sep. 7, 1977, 10934/77

Int. Cl.[2] F25B *15/10*

U.S. Cl. 62—490 **8 Claims**



1. In an absorption refrigerating unit of the type which circulates a coolant fluid and a solvent through a generator, a condenser, an evaporator, an absorber and an absorber vessel housing coolant rich solution which contains a corrosion inhib-

itor, said circulation being induced by a thermosiphon pump forming part of said generator, the combination comprising:

conduit means delivering a supply of said coolant rich solution from said absorber vessel to the vapor forming end of the liquid heat exchanger of said thermosiphon pump;

means for interrupting the supply of said coolant rich solution from said absorber vessel to said vapor forming end of said liquid heat exchanger after the angle of inclination of said absorption refrigerating unit exceeds a permissible angle of inclination at which said thermosiphon pump is able to pump liquid whereby only a limited amount of inhibitor rich solution can be produced during the period of time during which said unit exceeds said permissible angle of inclination.

4,176,530
DEVICE FOR COVERING WARP YARN WITH COVERING YARNS

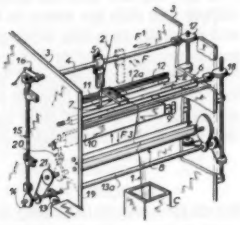
Claudius Cheynet, 18 rue Nationale, 43240 Saint Just Malmont, Haute-Loire, France

Continuation-in-part of Ser. No. 324,075, Jan. 16, 1973, abandoned. This application May 20, 1975, Ser. No. 579,327

Claims priority, application France, Jan. 4, 1972, 72.00862; Dec. 7, 1972, 72.44087

Int. Cl.[2] D04B *23/06;* D03D *15/08*

U.S. Cl. 66—203 **4 Claims**



1. A device for covering warp yarns with covering yarns comprising a row of yarn guides for feeding a plurality of elastic warp yarns in parallel longitudinal direction, means supporting said yarn guides for reciprocal movement solely in a direction transversely with respect to said warp yarns, a row of needles extending adjacent said yarn guides in a direction perpendicular thereto, means supporting said needles for reciprocal movement solely in a direction lengthwise of the needles and thereby perpendicular to the reciprocal movement of the yarn guides, means for supplying covering yarns to said needles in a direction substantially parallel thereto and perpendicular to the direction of feed of the warp yarns including a row of covering yarn displacing members extending substantially parallel to said needles and perpendicularly to said yarn guides for the elastic warp yarns, means supporting the covering yarn displacing members solely for reciprocal movement along an axis parallel to the axis of reciprocal movement of the yarn guides for the warp yarn and for pivotal movement in opposite directions about the axis of reciprocal movement of the covering yarn displacing members such that the yarn displacing members cooperate with said row of needles to cover said warp yarns with said covering yarns in the form of rows of loop stitches, means for feeding the thus covered yarns to a loom including a guide proximate said needles having a guide passage for travel of the individual covered warp yarns to the loom in a direction substantially parallel to the direction of feed of the warp yarns to the warp yarn guide, drive means for moving the yarn guides and needles for forming the covered warp yarns, lateral frame members which are spaced from each other, said means supporting the covering yarn displacing members comprising a first weftwise bar which mounts said row of covering yarn displacing members and which is carried by said lateral frame members for weftwise reciprocation and for swinging to-and-fro about a weftwise axis passing through said bar, said means supporting said warp yarn guides comprising a second weftwise bar which mounts the warp yarn guides and which is carried by said lateral frame members for weftwise reciprocation, said means supporting said needles comprising a third weftwise bar which mounts said row of needles and which is carried by said lateral frame members for reciprocation lengthwise of the needles, said guide of the means for directing the covered warp yarns to the loom comprising a fourth weftwise bar which is fixedly carried by said lateral frame members, and a fifth weftwise bar spaced above said fourth weftwise bar, the fourth and fifth weftwise bars guiding the covered warp yarns therebetween.

4,176,531
APPARATUS FOR THE WET TREATMENT OF TENSION-FREE GUIDED MATERIAL

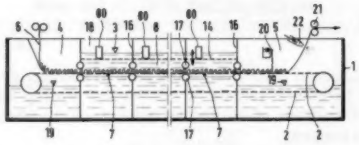
Hans Fleissner, Basel, Switzerland, assignor to Vepa AG, Switzerland

Division of Ser. No. 613,407, Sep. 15, 1975, Pat. No. 4,025,304. This application Feb. 10, 1977, Ser. No. 767,337

Claims priority, application Fed. Rep. of Germany, Sep. 14, 1974, 2444123; Oct. 18, 1974, 2449578; Mar. 6, 1975, 2509700

Int. Cl.[2] D06B *3/02*

U.S. Cl. 68—3 SS **48 Claims**



1. An apparatus for the wet treatment of fibrous material which comprises a container, means for providing a first liquid layer of a treatment liquid within said container, a liquid-permeable support means for supporting and transporting said material through said first liquid layer, said support means having a supporting surface on which the material is transported, and said support means being immersed in the first liquid layer and arranged below the liquid level of said first liquid layer within said container and means for maintaining a second liquid layer of the treatment liquid within said container extending uniformly along the entire length of the immersed supporting surface and spaced underneath said supporting surface of the support means to provide a free air space between said first and second liquid layers whereby liquid in the first liquid layer flows uniformly through the fibrous material supported on said support means by the effect of gravity and via said free air space into the second liquid layer.

4,176,532
APPARATUS FOR CONTINUOUSLY WASHING FABRIC WITH WATER

Takao Mishima, Suita; Shoji Semba, Osaka; Kiichi Ogata, and Osamu Funahashi, both of Wakayama, all of Japan, assignors to Kanebo, Ltd., Tokyo and Wakayama Iron Works, Ltd., Wakayama, both of, Japan

Continuation-in-part of Ser. No. 887,130, Mar. 16, 1978, abandoned. This application Nov. 30, 1978, Ser. No. 964,981

Claims priority, application Japan, Mar. 16, 1977, 52-29490

Int. Cl.[2] D06B *3/12*

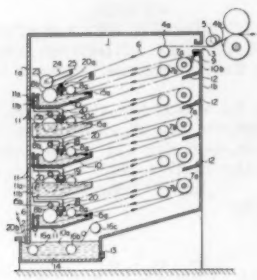
U.S. Cl. 68—19 **13 Claims**

1. An apparatus for continuously washing a fabric with water while causing the fabric to travel in a zigzag path and to be immersed many times in washing water, said apparatus comprising:

at least one roll for introducing a fabric into said apparatus;

a washing assembly located above said introducing roll and comprising a plurality of washing units arranged in a vertical multi-stage form, each washing unit comprising a

vessel for containing washing water, first and second dipping rolls located in said washing water vessel and first and second guide rolls spaced from said washing water vessel and respectively corresponding to said first and second dipping rolls, said first dipping roll and said second guide roll being located between said second dipping roll and said first guide roll, a portion of the peripheral surface of said first guide roll, from which portion the fabric leaves said first guide roll, being located above a portion of the peripheral surface of said first dipping roll, with which portion of said first dipping roll the fabric comes into contact, and a portion of the peripheral surface of said second guide roll, from which portion the fabric leaves



said second guide roll, being located above a portion of the peripheral surface of said second dipping roll, with which portion of said second dipping roll the fabric comes into contact;

at least one roll for withdrawing said fabric from said apparatus, located above said washing assembly;

means for feeding washing water into an uppermost washing water vessel;

means for connecting each of said washing water vessels, except for the lowermost washing water vessel, to the next lower washing water vessel, and;

means for discharging the waste washing water from said apparatus.

4,176,533

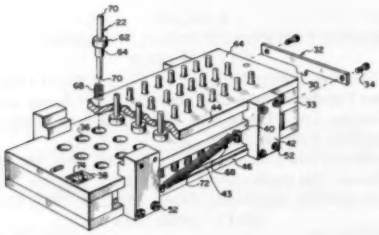
WALL SAFE LOCK

Paul A. Nordendale, 3740 Dauphine Ave., Northbrook, Ill. 60062

Continuation-in-part of Ser. No. 639,250, Dec. 10, 1975, abandoned. This application Oct. 14, 1977, Ser. No. 842,094

Int. Cl.[2] E05B *63/14, 37/16*

U.S. Cl. 70—115 **7 Claims**



1. A permutation wall safe lock having a set of small openings in the front wall of a safe door arranged in a predetermined pattern;

a guide member having a set of like small openings arranged in said predetermined pattern and providing therewith pairs of coaxially aligned openings;

a plate member slidably mounted on the guide member having like small openings coaxial with said set of openings;

resilient means engaging the plate member for urging its like small opening out of alignment with said set of openings;

means for supporting said front wall and guide member in predetermined spaced relation;

a manually operated door lock means including an oscillatable manually movable locking member mounted on said door;

a reciprocable slide bar means having large openings of the same shape as the small openings arranged in the same predetermined pattern and slidable in the spaces between the front wall and said guide member, said slide bar means being movable between two positions in one of which it is releasably interlocked with said manually movable locking member with its openings coaxial with said pairs of openings and in the other unlocked position its openings are held offset from said pairs of openings;

a plurality of freely reciprocable push pins slidably extending through said aligned openings for independent selective manual actuation and having large portions receivable in the large openings for normally inter-engaging in said one position the walls of said pairs of openings and said large openings to maintain said axial alignments and the slide bar in interlocking relationship with said manually movable locking member;

manual means for moving said slide bar means to said other position to dispose said slide bar means in locking engagement with said manually movable locking member; and

said resilient means urging said slide bar means out of engagement with said manually movable locking member when correctly permutated push pins are axially moved in said small openings to clear said slide bar openings for movement of the slide bar to said other position.

4,176,534

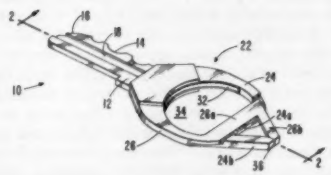
COMBINED CLIP AND QUICK RELEASE KEY

Jon F. Denney, 4443 Driftwood Pl., Boulder, Colo. 80301

Filed Jul. 21, 1978, Ser. No. 927,121

Int. Cl.[2] E05B *19/04*

U.S. Cl. 70—408 **9 Claims**



1. A combined clip and key for quick release or attachment to a keyholder including in combination:

a shank portion;

a bit portion shaped or shapable for operating a lock, said bit portion carried by said shank; and a bow for handling said key, said bow secured to said shank; wherein the improvement comprises, in combination:

said bow formed of a first bow portion and a second bow portion, both said first and second bow portions secured to said shank and located in substantially the same plane as said shank, said portions normally defining a first annular opening, at least one of said bow portions being resiliently movable with respect to said shank and independently moveable of said other bow portion; and

a first bow extension connected to said first bow portion, and a second bow extension connected to said second bow portion, said bow extensions forming a normally closed split ring loop defining a second annular opening, whereby movement of at least one bow portion causes

said normally closed split ring loop to split open for use as a clip or for release or attachment to a keyholder.

4,176,535

APPARATUS FOR CROPPING, DIVIDING AND REDUCING ROLLED MATERIAL AT HIGH SPEED

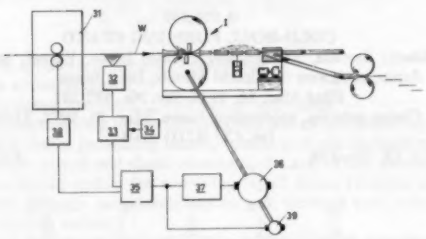
Wolfgang Elsner, Ratingen; Werner Kalter, Duisburg; Rolf Michel, Drensteinfurt, and Jörn Moslener, Dusseldorf, all of Fed. Rep. of Germany, assignors to DEMAG Aktiengesellschaft, Duisburg, Fed. Rep. of Germany

Filed May 4, 1978, Ser. No. 902,955

Claims priority, application Fed. Rep. of Germany, May 5, 1977, 2720136

Int. Cl.[2] B21B *1/00, 41/00*

U.S. Cl. 72—10 **2 Claims**



1. Apparatus for cropping, dividing and chopping rolled material running at high speed from the finishing line of a rolling mill, the combination characterized by

(a) rotary shears disposed in the rolling line of said mill after said finishing line;

(b) said rotary shears including

(1) opposed rotary drums;

(2) opposed radially displaceable cooperating cutter blades in said drums;

(3) reversible fluid acting piston and cylinder units in each said drum for displacing said blades from a non-cutting position in said drums to a cutting position extending partially from said drums;

(4) fluid acting servo valves in each said drum for controlling respective piston and cylinder units therein;

(c) a power operated switch in said rolling line after said rotary shears; said switch for directing successive ones of severed rolled material pieces to two continuing guides, the switch being movable from a first position to a second position while still guiding a rolled piece in the first postion;

(d) said switch including

(1) a guide tube comprised of a plurality of flexibly connected straight tube sections;

(2) the axis of the outlet portion of said guide tube movable from said first position coaxial with one continuing guide to said second position coaxial with the second continuing guide and vice versa;

(3) the outlet end of said outlet portion being spaced from the inlet end of each of said continuing guides;

(e) a chopper in said line after one of said continuing guides;

(f) said chopper including

(1) a pair of opposed rotatable chopper drums;

(2) means for rotating said drums at a peripheral speed greater than the speed of rolled material passing therethrough;

(3) at least one of said pairs of drums having fixed cutter blades over the surface thereof for chopping rolled material passing therethrough;

(4) a space between said opposed drums smaller than the diameter of rolled material passing therethrough;

(g) a laser speed test apparatus in said rolling line before said rotary shears; and

(h) said laser speed test apparatus including

(1) first means for testing the speed of rolled material passing therethrough;

(2) second means for testing the actual speed of the last rolling stand in said mill;

(3) means for correlating the results of said first and second test means for controlling the speed of said rotary shears.

4,176,536

DEVICE FOR PRODUCING A BEAD ON THE CIRCUMFERENCE OF A HOLLOW CYLINDER

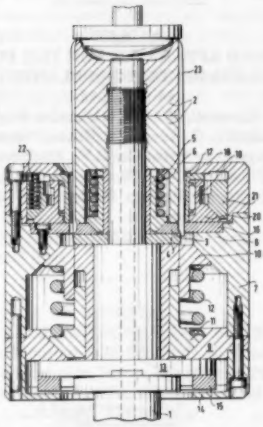
Walter Panknin; Kurt Finsterwalder, both of Göppingen; Reinhard Kannegiesser, Birenbach, and Hans Büssler, Eislingen, all of Fed. Rep. of Germany, assignors to L. Schuler GmbH, Fed. Rep. of Germany

Filed Jul. 17, 1978, Ser. No. 925,296

Claims priority, application Fed. Rep. of Germany, Jul. 16, 1977, 2732263

Int. Cl.[2] B21D *19/06*

U.S. Cl. 72—91 **7 Claims**

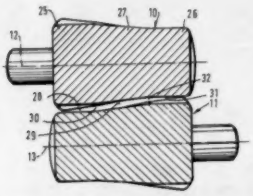


1. Device for producing a bead extending over a circumference of a hollow cylinder, such as a can body, with a circular, rotatable internal tool, of which the outer diameter is smaller than the inner diameter of the hollow cylinder after it has been beaded, and with a rotatable external tool in the form of a circular ring, of which the inner diameter is greater than the outer diameter of the unbeaded hollow cylinder, and the area of the hollow cylinder to be beaded can be rolled and deformed between the outer periphery of the internal tool and the inner periphery of the external tool and the external tool can be adjusted in a controlled manner in the radial direction, characterized in that the internal tool comprises a supporting mandrel and an inner ring, said inner ring being adjacent the supporting mandrel in the axial direction and being capable of being adjusted radially relative thereto, and the external tool comprises an outer ring surrounding the inner ring and a hold-down ring, said hold-down ring being adjacent the outer ring in the axial direction and being capable of being adjusted radially relative thereto.

4,176,537
METHOD OF AND MEANS FOR STRAIGHTENING BARS AND TUBES

Arthur N. Brown, Stourbridge, England, assignor to The Bronz Engineering Company, Ltd., Stourbridge, England

Filed Mar. 31, 1978, Ser. No. 892,160
Claims priority, application United Kingdom, May 5, 1977, 18825/77
Int. Cl.[2] B21D 3/04
U.S. Cl. 72—98 11 Claims

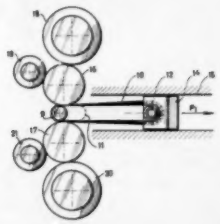


1. In a straightening machine comprising a pair of rolls between which there is defined a non-rectilinear path along which elongate material to be straightened is passed, said rolls are rotatable about respective axes and said axes are inclined to each other and to said path, whereby rotation of the rolls in the same direction about their axes causes the elongate material to move along said path and to rotate about its own longitudinal axis, the improvement wherein said path includes two bends and said bends lie in the same plane.

4,176,538
METHOD AND APPARATUS FOR THE FORMING OF METAL ENDLESS BELTS FROM BLANKS OF TUBULAR MATERIAL

Georg R. W. Kymmell, Waalre; Alexandre Horowitz, Eindhoven, and Rudolf J. G. A. van der Hoorn, Nuenen, all of Netherlands, assignors to Volvo Car B.V., Eindhoven, Netherlands

Filed Jun. 28, 1978, Ser. No. 920,120
Claims priority, application Netherlands, Jun. 28, 1977, 7707172
Int. Cl.[2] B21B 5/00
U.S. Cl. 72—110 7 Claims

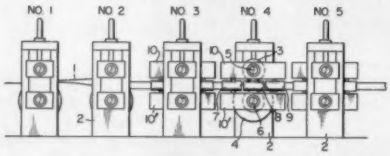


1. A method for forming thin flat endless metal belts from blanks of tubular material by inserting a stretch roll and a tensioning roller of relatively small diameter in parallel to each other through the interior of a said blank, engaging the tubing-stretch roll assembly between a pair of work rolls of relatively large diameter keeping the tube wall under pressure of the said work rolls, while rolling in a position of the said stretch roll offset to one side of a plane containing the axes of the said work rolls, the said tensioning roller being urged at the same time on the other side of the said plane in a direction away from this plane, characterised in that the said stretch roll and the said tensioning roll are inserted through a series of blanks which are spaced side by side along the length of the said stretch and tensioning rolls, the said blanks engaging areas of at least one of the said rolls having a step up range of diameters differing from each other to such an extent that in a final position of the said tensioning roller parallel to the said stretch roll the endless cylindrical belts on the said rolls fit one into the other for the formation of a multiple layer belt wherein the outer diameter of each inserted belt corresponds exactly with the inner diameter of an adjoining outer belt.

4,176,539
COLD-ROLL FORMING STAND

Takeshi Sawada, Yonago, and Takeshi Inoue, Yasugi, both of Japan, assignors to Hitachi Metals, Inc., Japan

Filed Mar. 16, 1978, Ser. No. 887,251
Claims priority, application Japan, Mar. 25, 1977, 52-32166
Int. Cl.[2] B21D 5/06
U.S. Cl. 72—178 3 Claims



1. A cold-roll forming mill which includes one or a plurality of cold-roll forming stands positioned in tandem for forming a flat metal strip into a desired section, said cold-roll forming stand comprising:

a pair of upper and lower transverse forming rolls adapted to engage an upper and lower surface of the flat metal strip for a lengthwise forming of said flat metal strip;

a pair of upper and lower transversely extending shafts for respectively mounting the pair of upper and lower transverse forming rolls;

a pair of intermediate longitudinal forming rolls for a widthwise forming of said flat metal strip;

a pair of upper and lower housing means extending parallel to a pass direction of the metal strip through the forming stand and being disposed on respective lateral sides of the metal strip for mounting said pair of intermediate longitudinal rolls to said upper and lower transversely extending shafts such that one of said intermediate longitudinal forming rolls is disposed on one lateral side of the metal strip and the other of said intermediate longitudinal forming rolls is disposed on the other lateral side of the metal strip, said upper and lower transversely extending shafts extending through said housing means;

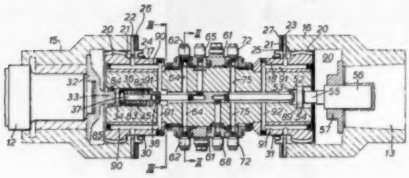
a pair of additional longitudinal forming rolls for widthwise forming of said flat metal strip mounted on said pair of upper and lower housing means at a position upstream of said pair of intermediate longitudinal forming rolls, such that said additional longitudinal forming rolls are disposed on respective lateral sides of the flat metal sheet; and

a further pair of longitudinal forming rolls for widthwise forming of said flat metal strip mounted on said pair of upper and lower housing means at a position downstream of said pair of intermediate longitudinal forming rolls such that said further longitudinal forming rolls are disposed on respective lateral sides of the flat metal sheet, whereby said flat metal strip is subjected to both a lengthwise and widthwise bending and curving.

4,176,540
SPLINED ARTICULATED COUPLING

Bernard H. Barber, Sheffield, England, assignor to Davy-Loewy Limited, Yorkshire, England

Filed Mar. 16, 1978, Ser. No. 887,406
Claims priority, application United Kingdom, Mar. 18, 1977, 11614/77
Int. Cl.[2] B21B *27/08*
U.S. Cl. 72—201 **10 Claims**

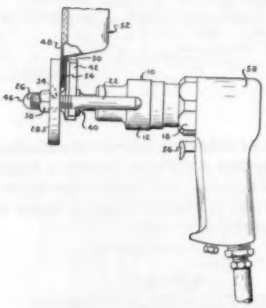


1. An articulated coupling comprising:
(a) a rotatable shank;
(b) a sleeve surrounding one end of said shank;
(c) drive coupling means between said end of said shank and said sleeve permitting limited variation in the inclination of the axis of said shank relative to the axis of said sleeve;
(d) a supply system for supplying liquid under pressure to and through said shank and to and through said drive coupling means;
(e) a liquid return conduit leading from said drive coupling means through said shank to withdraw liquid delivered from said means, said return conduit constructed and arranged to rotate with said shank; and
(f) means for withdrawing liquid through said conduit under suction.

4,176,541
HAMMER DEVICE ATTACHMENT

Tallie B. Cooper, 881 E. 36th Ave., Gary, Ind. 46408

Filed Jun. 14, 1978, Ser. No. 915,363
Int. Cl.[2] B21D *37/14*
U.S. Cl. 72—474 **5 Claims**

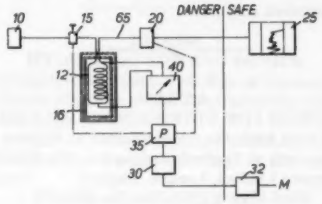


1. A hammer attachment for a reciprocating drive means to fold sheet metal edges, comprising:
a body member having a longitudinal bore centrally therethrough, one end of said body member having means for connection to said reciprocating drive means;
support means connected to each side of said body member extending longitudinally from the other end of said body members;
an anvil means connected to said support means, said anvil means having a bore in alignment with said bore of said body member; and
a hammer member, said hammer member having a longitudinal shaft and an impacting pad extending radially from said shaft intermediate the ends thereof, said pad being pivotally movable between said support means, said one end of said longitudinal shaft being reciprocatingly movable in said bore of said body member and the other end of said shaft being reciprocatingly movable in said bore of said anvil means.

4,176,542
ANALYSIS INSTRUMENTS

Robert J. Redding, September House, Cox Green La., Maidenhead, England (S16 3EL)

Filed Nov. 1, 1977, Ser. No. 847,604
Claims priority, application United Kingdom, Nov. 2, 1976, 45397/76
Int. Cl.[2] G01N *31/08*
U.S. Cl. 73—23.1 **10 Claims**

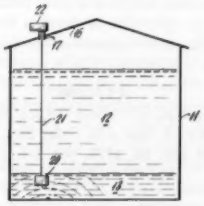


1. An intrinsically safe chromatographic analysis device to be encapsulated in a rigid body of electrically insulating material, said device having input connections for supply to said device from a source of electric power, and output connections to transmit analysis data from said device to remote monitoring means;
said device further comprising at least one electrically heated analytical element, intrinsically safe electrical energy supply means electrically connected between said input connections and said at least one electrically heated analytical element;
said supply means incorporating storage means to accumulate energy from the said source during periods of low electrical load and control means operable to cause at least partial discharge of the accumulated energy at periods of high electrical load.

4,176,543
SONIC LEAK DETECTOR AND METHOD

David G. Nolte, Houston, and Winthrop K. Brown, Bellaire, both of Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Nov. 17, 1978, Ser. No. 961,598
Int. Cl.[2] G01M *3/24*
U.S. Cl. 73—40.5 A **9 Claims**



1. Sonic leak detector for use in a liquid storage tank or the like, comprising
a hydrophone for generating electrical signals in accordance with sonic waves in said liquid,
circuit means for amplifying and filtering said electrical signals to pass signals above a predetermined minimum frequency that is below the frequency range of leak generated sonic waves,

a pair of band pass filters connected to the output of said circuit means,

one of said band pass filters passing a predetermined band of sonic frequencies covering the range of said leak generated sonic waves,

the other of said band pass filters passing a different predetermined band of sonic frequencies outside of said leak generated range of frequencies,

electronic means for blanking output signals from both of said band pass filters upon receipt of an impulse noise signal passed by said other band pass filter and having more than a predetermined amplitude,

a differential amplifier having inputs connected to said band pass filters and having an output, and

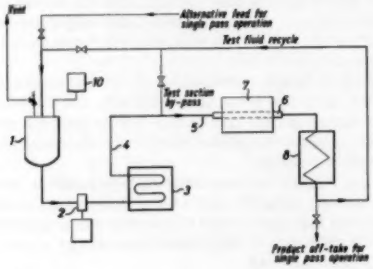
leak indicator means connected to said output of said differential amplifier for indicating the existence of a leak when said differential amplifier output signal level exceeds a predetermined amount.

4,176,544

METHOD FOR DETERMINING FOULING

Martin K. Eyles, Addlestone, and Graham L. Wagner, Walton-on-Thames, both of England, assignors to The British Petroleum Company Limited, London, England

Filed May 4, 1978, Ser. No. 902,672
Int. Cl.[2] G01N *17/00*
U.S. Cl. 73—61.2 **5 Claims**



1. A method for detecting the fouling tendency of a heated hydrocarbonaceous liquid which method comprises heating the liquid, adding to it a solution or suspension containing one or more inorganic and/or organic foulants to give an enhanced concentration of foulant in the liquid, passing the resulting liquid through a heated tubular test section and measuring the increase in pressure drop across the test section over a period of time.

4,176,545

ELECTRONIC ENGINE WEAR DETECTOR

Luigi G. Oddo, Rte. 2, Box 270, Palm Bay, Fla. 32905

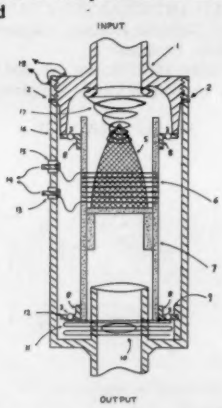
Filed Jun. 16, 1978, Ser. No. 916,295
Int. Cl.[2] G01N *33/30*
U.S. Cl. 73—64 **8 Claims**

1. An apparatus for detecting particles in a fluid stream, comprising in combination:

a housing for receiving and guiding the fluid stream therethrough;

filter means interposed within said housing for blocking and collecting on an exposed surface thereof the particles while enabling the flow of the fluid therethrough;

inductance means for sensing the changes in the permeability of the area adjacent to said filter means corresponding to the collection of the particles on said exposed surface thereof; and



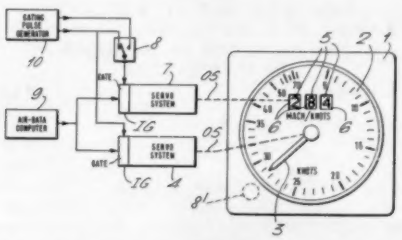
circuit means coupled to said inductance means for displaying the permeability thereof so as to indicate the relative presence of the particles on said filter means.

4,176,546

AIRCRAFT INSTRUMENTS

Harry Gibson, Tewkesbury, and John W. D. Jones, Stonehouse, both of England, assignors to Smiths Industries Limited, London, England

Continuation-in-part of Ser. No. 825,754, Aug. 18, 1977, abandoned. This application Nov. 22, 1978, Ser. No. 963,066
Int. Cl.[2] G01C *21/10*
U.S. Cl. 73—182 **9 Claims**



1. An aircraft-speed indicating instrument including an index that is moveable against a scale to provide a reading of airspeed, and a digital indicator, and wherein the digital indicator is arranged to provide selectively either a digital reading of Mach number or of said airspeed.

4,176,547

TORQUE CORRELATION RING

John W. McClure, Milford, and George S. Hudson, Hamden, both of Conn., assignors to Avco Corporation, Stratford, Conn.

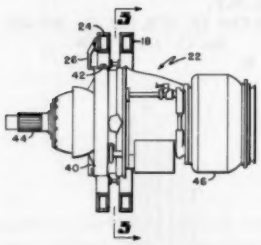
Filed Nov. 14, 1977, Ser. No. 850,990
Int. Cl.[2] G01L *3/02*
U.S. Cl. 73—136 R **9 Claims**

1. A torque correlation ring assembly for an engine test stand having frame members extending therefrom, said test stand being useful in measuring performance of an aircraft turboshaft engine having both an output shaft and a casing with mounting points for fixedly suspending said engine, the output shaft being fitted with a propeller of known characteristics, the torque correlation ring assembly comprising:

a first vertically oriented annular ring fixedly attached along one edge to the frame members of said test stand;

a plurality of equally spaced strain gaged beams each fixedly attached at one of its ends to that edge of said first annular ring which is opposite the edge attached to said frame members, each of said strain gaged beams having a central beam section, the centerlines of said central beam sections being oriented so as to coincide with radials extending from the center of said annular ring;

a second vertically oriented annular ring fixedly attached along one edge to the second ends of said strain gaged beams;



a mounting jig attached at its periphery to the second edge of said second annular ring, the inner edge of said mounting jig being configured for attachment to the mounting points on the casing of said aircraft engine, said aircraft engine being mounted coaxially within said annular rings so that its output shaft extends axially along the centerline of said first and second annular rings;

strain gages attached to each of said central beam sections, the plurality of said strain gages being wired together to produce an electrically combined signal capable of being processed to provide an accurate measurement of the torque applied to said torque correlation ring assembly.

4,176,548
HYDROSTATIC TORQUE MEASURING DEVICE FOR ROTATING SHAFTS

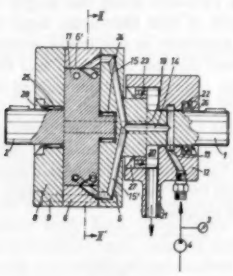
Ivan J. Cyphelly, Neuhaus, Hinteregg, Switzerland (8128)

Filed Jun. 16, 1978, Ser. No. 916,211

Claims priority, application Switzerland, Jun. 20, 1977, 7531/77

Int. Cl.[2] **G01L** *3/02*

U.S. Cl. 73—136 D **4 Claims**



1. In a hydrostatic torque measuring device for rotating shafts, the device comprising an input shaft and an output shaft, one of which is rigidly connected with a rotary wing piston and the other of which is rigidly connected with a cylinder having a wall in which the rotary wing piston is arranged, pressure chambers being formed in the cylinder by the rotary wing piston, to which chambers a pressure medium is supplied and the cylinder being provided with a plurality of cams to form automatically balancing throttle slits with the rotary wing piston in such a manner that the compressive force of the pressure medium, which is in equilibrium with the exerted torque, forms a measure for the magnitude of the torque, the improvement wherein said rotary wing piston is formed with a plurality of radially extending arms, and wherein said plurality of cams project from said cylinder wall with said wing piston arms extending between a frontal surface of said cams in such a manner that said arms of said rotary wing piston, said cams and said cylinder wall define a plurality of pressure chambers and an equal plurality of exhausted chambers, throttling surfaces at one of two edges of said frontal surface of each said cam forming an inner boundary surface of each said pressure chamber, said throttling surfaces forming with opposite surfaces of said arms of said rotary wing piston throttling slits for said pressure chambers in each direction of rotation of said rotary wing piston, and acting as stops therefor, and a return passage for the pressure medium being provided in each said cam and having an opening at said frontal surface thereof.

4,176,549
HYDRAULIC RIGGING DEVICE

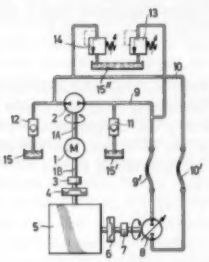
Johann Eichinger, Vaterstetten, Fed. Rep. of Germany, assignor to Carl Hurth Maschinen- und Zahnradfabrik, Munich, Fed. Rep. of Germany

Filed Aug. 30, 1978, Ser. No. 938,071

Claims priority, application Fed. Rep. of Germany, Sep. 7, 1977, 2740197

Int. Cl.[2] **G01M** *13/02*

U.S. Cl. 73—162 **12 Claims**



1. A hydraulic rigging device for testing of drive aggregates, as for example shafts, couplings, gears and gearings, comprising:

a pair of hydro-units of which one functions as a pump, the other one functions as a motor, each of said hydro-units having a shaft thereon;

a drive means for driving the shaft on said hydro-unit functioning as a pump;

means defining a high pressure line and a low pressure line connected in circuit with said hydro-units such that an oil circulation circuit is created, whereby each line changes the pressure range upon reversal of the conveying direction of the hydro-unit which functions as a pump;

a testing member having a pair of rotatable shafts thereon interconnected therewith, a driving rotation of either one of said shafts effecting a driven rotation of the other shaft, whereby the torque output on the shaft from the hydro-unit which functions as a motor is included into the power flow consideration of the rigged mechanical system and is used to drive through said testing member said hydro-unit which functions as a pump, so that said drive means must then only yet balance out the occurring losses within the system;

pressure-regulating means for limiting the pressures in said high pressure line and said low pressure line, whereby the pressure difference is co-determining for the magnitude of said rigging; and

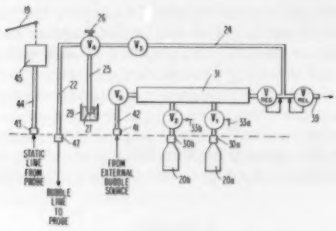
means for balancing out the leakage losses which are created in the oil circultion circuit.

4,176,550

DEPTH/FLOW MONITORING INSTRUMENTATION

Charles L. McClure, Malvern, Pa., assignor to Pro-Tech, Inc., Paoli, Pa.

Filed Feb. 6, 1978, Ser. No. 875,225
Int. Cl.[2] G01F *23/14*
U.S. Cl. 73—302 **8 Claims**



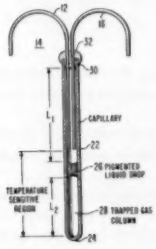
1. Pressure-responsive recorder for use with a bubbler type of sensing probe for monitoring depth or flow of liquid in a sewer or water pipe or conduit, comprising a housing, pressure-responsive means therein, means thereon for supporting a bubble fluid container, means therein for receiving bubble fluid from such container, means therein for regulating the rate of release of bubble fluid from such container means for connecting released bubble fluid to a connecting line to such probe, and means thereon for connecting a static pressure line from such probe to the pressure-responsive means thereon.

4,176,551

FIBER-OPTIC THERMOMETER

Jacob M. Hammer, Plainsboro, N.J., and Clyde C. Neil, Levittown, Pa., assignors to RCA Corporation, New York, N.Y.

Filed Oct. 10, 1978, Ser. No. 949,428
Int. Cl.[2] G01K *5/32*
U.S. Cl. 73—339 R **8 Claims**



1. In a fiber-optic thermometer comprising a fiber-optic input for applying input light, a fiber-optic output for extracting output light, and a temperature-sensitive medium optically coupling said fiber-optic input to said fiber-optic output for transferring a proportion of the applied input light from said fiber-optic output, the size of said transferred proportion being a single-valued function of the temperature of said medium; the improvement therein;

wherein said medium comprises a gas-sealing movable reflecting element disposed within a capillary that has one end thereof sealed, and a column of trapped gas situated between said one end of said capillary and said element, said element being supported by the pressure and moved by changes in the pressure of said trapped gas, whereby the length of said gas column and, hence, the position of said element along the length of said capillary is determined by the temperature of said gas, and

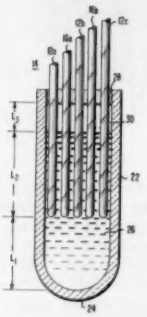
wherein each of said fiber-optic input and fiber-optic output extends into the other end of said capillary and terminates at a fixed point along the length of said capillary situated between said element and said other end of said capillary, whereby the proportion of applied input light transferred from said fiber-optic output by reflection from said element is a single-valued function of the position of said element along the length of said capillary.

4,176,552

FIBER-OPTIC THERMOMETER

Jacob M. Hammer, Plainsboro, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Oct. 10, 1978, Ser. No. 949,435
Int. Cl.[2] G01K *5/04*
U.S. Cl. 73—339 R **7 Claims**



1. In a fiber-optic thermometer comprising a fiber-optic input for applying input light, a fiber-optic output for extracting output light, and a temperature-sensitive medium optically coupling said fiber-optic input to said fiber-optic output for transferring a proportion of the applied input light from said fiber-optic output to said fiber-optic output, the size of said transferred proportion being a single-valued function of the temperature of said medium; the improvement therein:

wherein said medium comprises a fixed amount of a given liquid situated within and partially filling a capillary having a certain length, said liquid exhibiting a predetermined temperature coefficient of expansion,

said fiber-optic input and said fiber-optic output extending in spaced relationship with respect to each other into said capillary in a direction along the length thereof with a portion of each of said fiber-optic input and fiber-optic output being immersed in said liquid, whereby the length of the immersed portion of each of said fiber-optic input and fiber-optic output is a single-valued function of the temperature of said given liquid, and

wherein the light transmission characteristic between said fiber-optic input and said fiber-optic output along the length of the liquid-filled region of said capillary is significantly different from that along the length of the unfilled region of said capillary.

4,176,553

LIQUID LEVEL MEASURING SYSTEM

Tony J. Wood, Ann Arbor, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 21, 1978, Ser. No. 971,974
Int. Cl.[2] G01F *23/26*
U.S. Cl. 73—304 C **20 Claims**

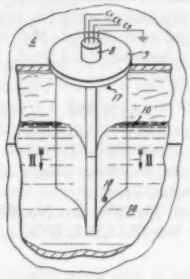
1. A system for measuring liquid within a tank having a known configuration and referential orientation comprising:

means for sensing the level of said liquid at a plurality of locations in said tank;

means for interrogating said sensing means to derive a sepa-

rate value signal of said liquid level from each of said plurality of locations;

means for sampling said separate value signals of liquid level and measuring differences between each of said separate value signals;



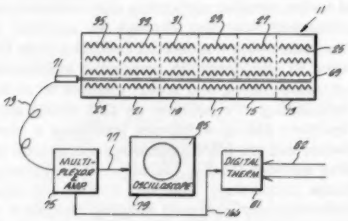
means responsive to one of said separate value signals and said measured differences for producing a liquid level output signal only when said measured differences are below a predetermined amount.

4,176,554

METHOD AND APPARATUS FOR OBTAINING THE TEMPERATURE PROFILE OF A KILN

Casimir W. Kazmierowicz, 26546 Aracena Dr., Mission Viejo, Calif. 92675

Filed Nov. 9, 1977, Ser. No. 849,783
Int. Cl.[2] G01K *7/14*
U.S. Cl. 73—341 **18 Claims**



1. A system for obtaining the temperature profile of a kiln, comprising:

a temperature probe having a protective metallic sheath, a plurality of thermocouple temperature measuring junctions located in said sheath, each thermocouple being end connected, disposed along the length of the sheath at spaced intervals, all the wire leads of one type from each thermocouple junction being connected together to a single common lead, high temperature insulation surrounding each thermocouple junction and the wire leading thereto and a plurality of intermediate reference junctions, one for each of said temperature measuring junctions and one for the common lead located at one end of said sheath;

multiplexing means receiving the individual signals from each thermocouple junction in said temperature probe for sequentially sampling each signal for a finite period of time; and

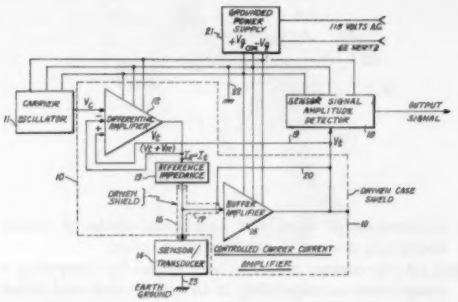
display means receiving the sampled signals from said multiplexing means for displaying the received signal samples as an indication of the temperature relationship between the received signal samples.

4,176,555

SIGNAL AMPLIFIER SYSTEM FOR CONTROLLED CARRIER SIGNAL MEASURING SENSOR/TRANSDUCER OF THE VARIABLE IMPEDANCE TYPE

Richard A. Dorman, Troy, N.Y., assignor to Mechanical Technology Incorporated, Latham, N.Y.

Filed Aug. 7, 1978, Ser. No. 931,664
Int. Cl.[2] G01H *11/00*
U.S. Cl. 73—658 **10 Claims**



1. A controlled carrier circuit measuring sensor/transducer signal amplifier system including in combination a carrier signal oscillator for providing a carrier oscillatory signal of known frequency and fixed voltage magnitude, differential amplifier means having the carrier oscillatory signal supplied to one of the inputs thereof, reference impedance means and variable impedance sensor/transducer means connected in series circuit relationship across the output of said differential amplifier means, means for feeding back a first feedback signal to a second input to said differential amplifier means, said first feedback signal comprising the sum of the voltages across said reference impedance means and said variable impedance sensor/transducer means in series, buffer amplifier means having the input thereof connected to the juncture of the reference impedance means and the variable impedance sensor/transducer means for deriving an output voltage signal representative of the instantaneous value of the voltage across said variable impedance sensor/transducer means, and means for feeding back said output voltage signal from the output of said buffer amplifier means to a third input to said differential amplifier means in opposition to said first feedback signal for regulating the current supplied through said reference impedance means and said variable impedance sensor/transducer means to a substantially constant magnitude whereby the output voltage signal from said buffer amplifier means provides a measure of the impedance of said variable impedance transducer means.

4,176,556

ELECTRONIC THERMOMETER

Kunio Takenaka, Nagaokakyo, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Nov. 8, 1977, Ser. No. 849,805
Claims priority, application Japan, Jun. 17, 1977, 52-72522; Jun. 20, 1977, 52-73756; Jun. 22, 1977, 52-74651; Jun. 22, 1977, 52-74652; Aug. 10, 1977, 52-96346; Aug. 10, 1977, 52-96347
Int. Cl.[2] G01K *7/24*
U.S. Cl. 73—362 AR **10 Claims**

1. An electronic thermometer comprising:

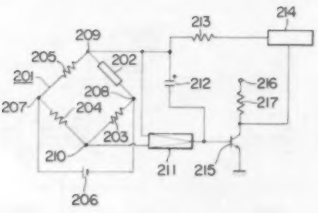
a display for displaying a temperature;

a bridge circuit having a temperature responsive transducer in a branch thereof for producing an unbalanced voltage with a predetermined polarity when a reference temperature is exceeded;

a charge-and-discharge circuit including a capacitor connected to said temperature responsive transducer which is charged by said unbalanced voltage;

a microprocessor provided with a reference value corresponding to said reference temperature, a counting means for counting a count equivalent to said reference value and means for discharging said charge-and-discharge circuit if a temperature of said temperature responsive transducer is exceeding said reference temperature when said counting means counts to said counted value; and

an interrupt circuit for applying an interrupt signal to said



microprocessor when said charge-and-discharge circuit discharges down to a predetermined value;

said microprocessor provided with means for computing a temperature corresponding to an added value, said added value being determined by adding a value which is counted from the time of the start of said discharge until the time said interrupt signal is produced to said reference value, said microprocessor further including means for causing a display of said added value on said display.

4,176,557

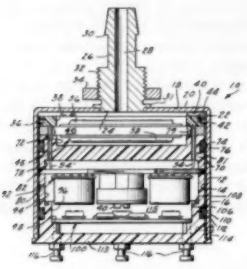
PRESSURE SENSOR

Samuel A. Johnston, Fontana, Wis., assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Continuation of Ser. No. 693,436, Jun. 7, 1976, abandoned. This application Apr. 24, 1978, Ser. No. 899,236

Int. Cl.² G01L *7/10*

U.S. Cl. 73—708 **55 Claims**



1. A pressure transducer comprising:

a hollow metal can including a closed end and an open end and a closed end, an aperture in said closed end for receiving fluid pressure;

a first insulator closing said open end of said hollow metal can, said first insulator including a shoulder, and a first groove therein;

a first heater in said first groove;

a second insulator adjacent said closed end of said metal can, said second insulator including a second groove therein;

a second heater in said second groove;

a third insulator within said metal can between said first and second insulators sealing the interior of said can to provide first and second chambers;

a pressure transducer mounted on said third insulator in said first chamber in communication with said aperture, said transducer responsive to pressure to provide a corresponding electrical value;

an electronic sensing circuit mounted on said third insulator within said second chamber and electrically connected to said pressure transducer to provide an electrical signal corresponding to said electrical value; and

a heater circuit mounted on said shoulder of said first insulator, said heater circuit connected to said first and second heaters and operable to maintain the temperature within said housing at a predetermined level.

4,176,558

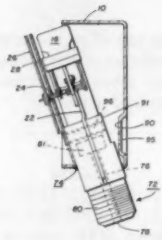
PRESSURE GAUGE CASING-TO-SOCKET CONSTRUCTION

Richard H. Wetterhorn, Fairfield, Conn., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Mar. 17, 1978, Ser. No. 887,588

Int. Cl.² G01L *7/04*

U.S. Cl. 73—741 **13 Claims**



1. In a condition responsive instrument including a condition responsive mechanism operably movable in response to condition changes of a measured condition state to which it is sensitive, a casing surrounding said condition responsive mechanism, a rigid socket member supporting said condition responsive mechanism and extending through an aperture in said casing for communicating a measured condition state from an external source to said condition responsive mechanism and attachment means securing said socket member to an internal surface of said casing at a location on said casing displaced from said aperture and in a manner providing a clearance relation between said condition responsive mechanism and the internal casing surfaces thereat, the improvement comprising interlock means cooperating with said attachment means for affording bidirectionally increased bending resistance of said casing, said interlock means including a contiguous fit formed between a wall surface of said socket member at said aperture and the opposing casing wall defining said aperture thereat.

4,176,559

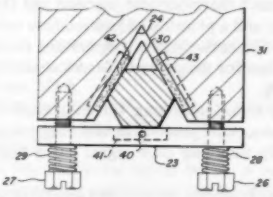
MULTI-PURPOSE TOOL

James E. Williams, 1318 W. 20th, Hastings, Minn. 55033

Filed Sep. 16, 1977, Ser. No. 833,874

Int. Cl.² F16H *21/44*

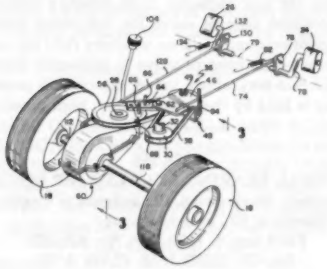
U.S. Cl. 74—102 **4 Claims**



1. A multi-purpose tool for precision hand-operated reciprocation, comprising:

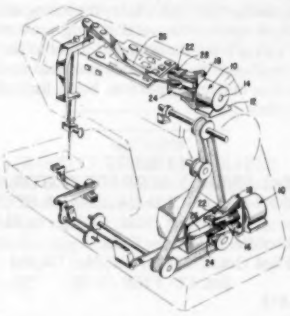
(a) a tool stand having a support attached thereto;
(b) a tool assembly clamped about said support for adjustable positioning thereon;
(c) a notch cut through an edge of said tool assembly;
(d) a plate bridging said notch, said plate being attached to said tool assembly by bolt and spring members to urge said plate toward said notch;
(e) a top and bottom bearing plate, each having a triangular notch therein and each affixed to said tool assembly and respectively spaced apart with a triangular notch of each respectively aligned with said tool assembly notch;
(f) a plunger having a first and second end and having a hexagonal cross section, said plunger being slidably movable between said bridging plate and said top and bottom bearing plates, two hexagon surfaces of said plunger contacting respective bearing plate triangular notches and one hexagon surface contacting said bridging plate, said plunger having its first end adapted for attachment to a tool;
(g) a handle pivotally connected at one end to said tool assembly and pivotally connected along its length to said plunger second end; and
(h) means for lubricating said plunger hexagon surface, said means being located in said bridging plate; whereby said bridging plate may be adjustably held against said plunger hexagon surface to provide variable resistance to said plunger slidable movement.

4,176,560
VARIABLE SPEED DRIVE
George C. Clarke, 10509 Penfield Ave., Chatsworth, Calif. 91311
Filed Apr. 27, 1977, Ser. No. 791,226
Int. Cl.[2] F16H *55/56, 55/36*
U.S. Cl. 74—230.17 A **23 Claims**



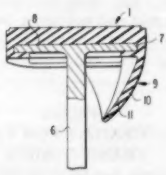
1. A variable speed drive comprising a frame; a driving pulley and a driven pulley each rotatably mounted with respect to said frame; a double pulley variable speed sheave assembly; a first belt reeved about said driving pulley and sheave assembly; a second belt reeved about said driven pulley and sheave assembly; first means including a bell crank having a pivot, a first arm carrying said sheave assembly and a second arm; means for shifting the position of said sheave assembly with respect to said driving and driven pulleys for altering the drive ratio of said sheave assembly through a range of low to high speed operating positions; means for attaching the shifting means to the second arm; second means pivotally connected to the bell crank pivot and the frame and means for biasing said sheave assembly generally away from said driving and driven pulleys to maintain said first and second belts under driving tension and for variably controlling the magnitude of driving tension forces on said first and second belts in accordance with operating speed.

4,176,561
LOW TOLERANCE ROTARY TO LINEAR TRANSMISSION
Donald R. Davidson, Berkely Heights, N.J., assignor to The Singer Company, New York, N.Y.
Filed Nov. 23, 1977, Ser. No. 854,291
Int. Cl.[2] F16H *1/20*
U.S. Cl. 74—424.8 A **3 Claims**



1. A device for converting rotary motion into linear motion for use in influencing the stitch bight and work feed mechanisms of a sewing machine comprising a mounting base, a shaft journaled in said base, drive means for imparting rotary motion to said shaft, a threaded worm rigidly mounted on said shaft, a pair of threaded split nuts disposed about said worm each in meshing relation therewith, a drive arm pivotally connected to said split nuts, and resilient means anchored on said mounting base and engaging each of said split nuts for urging said split nuts against said worm and for guiding said split nuts along the axis of said worm, whereby rotational motion of said worm is converted into translational motion of said drive arm along the axis of said worm.

4,176,562
ANTI-SKID PROTECTIVE CAP ESPECIALLY OF RUBBER, FOR ACTUATING PEDALS OF A MOTOR VEHICLE
Anton Allert, Stuttgart; Friedrich Weiss, Neuhausen, and Peter Schrape, Stuttgart, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany
Filed Jan. 13, 1977, Ser. No. 759,174
Claims priority, application Fed. Rep. of Germany, Jan. 29, 1976, 2603227
Int. Cl.[2] G05G *1/16;* **C08L** *15/02;* **C08C** *19/12*
U.S. Cl. 74—563 **19 Claims**



1. An anti-skid protective cap for one of a plurality of actuating pedals, such as brake pedals and the like, of a motor vehicle of the type having a plurality of actuating pedals selectively actuated by the shoe of the vehicle operator; said protective cap comprising:
an upwardly facing roughened anti-skid surface portion engageable by an operator's shoe during normal in-use actuation of a pedal having said cap,

means for accommodating attachment of said cap to said pedal,

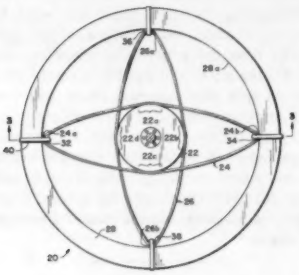
and a shoe deflecting sliding surface portion projecting downwardly from a side edge of said anti-skid surface portion, which side edge faces an adjacent actuating pedal, said shoe deflecting surface portion exhibiting a relatively smooth substantially uninterrupted surface extending over its entire length from the anti-skid surface portion to the bottom of the shoe deflecting surface portion and being of sufficient length so as to accommodate sliding of the vehicle operator's shoe along said shoe deflecting surface portion while preventing said shoe from getting stuck under the pedal during movement of said operator's shoe from the adjacent pedal to the pedal with said cap, said cap, including said anti-skid surface portion and said shoe deflecting portion, being formed as an integral one-piece part.

4,176,563

INERTIAL ENERGY STORAGE ROTOR WITH TENSION-BALANCED CATENARY SPOKES

Francis C. Younger, Berkeley, Calif., assignor to Electric Power Research Institute, Palo Alto, Calif.

Filed Oct. 27, 1976, Ser. No. 736,031
Int. Cl.[2] F16F *15/30*
U.S. Cl. 74—572 **8 Claims**



1. In an inertial energy storage rotor including a central hub and a concentric annular ring radially spaced therefrom, the improvement comprising:

a plurality of spoke elements in the shape of an elongate closed loop having a pair of central segments, a pair of opposed end segments, and curved segments connecting said spoke end segments and said spoke central segments, each of said curved segments having a shape substantially that of a polar catenary curve so that at the operating speed of said rotor said spoke elements are subjected generally only to tension forces directed substantially along the curved segments, said spoke elements being connected to said hub along said central segments and to said ring along said end segments; and

a plurality of weights, each of said weights being secured to a corresponding spoke end segment.

4,176,564

CONTROL ARRANGEMENT FOR VARIABLE POWER TRANSMISSION

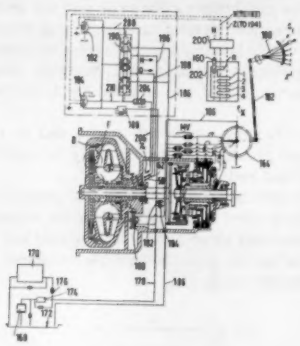
Karl G. Ahlen, Bromma; Per-Olof Bergstrom, Ektorp, and Joseph Supanich, Stockholm, all of Sweden, assignors to S.R.M. Hydromekanik Aktiebolg, Stockholm-Vallingby, Sweden

Filed Oct. 4, 1976, Ser. No. 729,422
Claims priority, application Fed. Rep. of Germany, Jan. 29, 1976, 2621447; United Kingdom, May 26, 1976, 03527/76
Int. Cl.[2] F16H *47/00, 57/10*
U.S. Cl. 74—732 **19 Claims**

1. A variable power transmission for motor vehicles comprising:

a multi-speed planetary gear having primary and secondary shafts journalled with respect to a casing, a planet carrier drivingly engaged with one of said shafts, planet gears rotatively mounted on the planet carrier and having at least two sections of different diameter, at least three annular gears, each engagable with one of the planet gear sections, such that each gear section has at least one annular gear engaged therewith, one of the annular gears being a drive annular gear engaged with a second of said shafts, a friction coupling means for holding each of the annular gears stationary relative to the casing, and a servo-motor non-rotatively mounted in the casing for operating each of said friction coupling means,

a multi-position control valve for selectively controlling



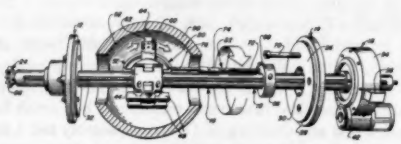
operation of individual ones of said servo-motors to in turn engage their respective friction couplings, a fluid source including a low pressure, high capacity pump, first and second fluid circuits connected in parallel between the fluid source and the multi-position control valve, the first fluid circuit including a low capacity, high pressure pump, and the second fluid circuit including a one-way check valve openable for delivering fluid into the first circuit between the low capacity, high pressure pump and the multi-position control valve for delivering fluid to said multi-position control valve, whereby fluid for delivery to the multi-piston control valve is delivered first through the said one-way check valve, afterwhich pressure thus built up is held by the low capacity, high pressure pump.

4,176,565

SPHERICAL BEARING SEAT CUTTER MACHINE

Dieter Christoph, Streamwood, Ill., assignor to Siegfried Schulz, Rolling Meadows, Ill., a part interest

Filed Sep. 5, 1978, Ser. No. 939,323
Int. Cl.[2] B23B *3/28, 41/00, 3/22*
U.S. Cl. 82—12 **18 Claims**



1. A portable spherical bearing seat cutter machine for cutting a spherical bearing seat comprising: a pair of spaced supports adapted for being connected to a workpiece having a spherical bearing seat for supporting the cutter machine on the workpiece; a drive shaft rotatably mounted in the spaced supports; a rotary drive connected to the drive shaft for rotating the drive shaft in the spaced supports; a cutter assembly mounted on the drive shaft rotatable with the drive shaft, said cutter assembly including a cutting tool rotatable with the drive shaft for cutting the spherical bearing seat in the work-

piece, and means for determining movement of the cutting tool relative to the drive shaft in an arcuate path; and an arcuate drive connected to the cutting tool for moving the cutting tool relative to the drive shaft in the arcuate path while the drive shaft is rotating.

4,176,566

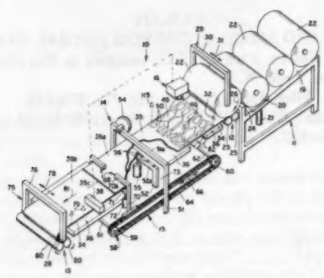
CREEL LOADING AND CUTTING SYSTEM

Thomas K. Patterson, Dublin; William O. Mitchell; Donald H. Smith, both of Vidalia, and John P. Hunter, Jr., Dunwoody, all of Ga., assignors to Oxford Industries, Inc., Atlanta, Ga.

Division of Ser. No. 766,240, Feb. 7, 1977, Pat. No. 4,082,589. This application Mar. 16, 1978, Ser. No. 887,061

Int. Cl.[2] B26D *7/00*; D06H *7/00*

U.S. Cl. 83—29 **7 Claims**



1. A process of cutting garment pattern parts or the like comprising moving sheet material along its length from a supply, projecting an image with cut positions on the moving sheet material and moving the image at a velocity equal to the velocity as the sheet material, severing the sheet material at the cut positions projected on the sheet material, accumulating the cut lengths of sheet material on spools, placing the spools in a creel, pulling the ends of the cut lengths of sheet material from the spools onto a support surface in vertically stacked relationship, and cutting through the stack of cut lengths of sheet material.

4,176,567

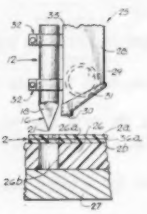
METHOD OF MAKING A TEAR LINE-FORMING PERFORATION IN A SEALED MARGINAL PORTION OF A BAG AND A SEALED BAG FORMED THEREBY

Warren Weisberg, 2406 Grant, Evanston, Ill. 60201

Division of Ser. No. 779,033, Mar. 18, 1977, abandoned. This application May 1, 1978, Ser. No. 901,932

Int. Cl.[2] B26F *1/18*

U.S. Cl. 83—30 **8 Claims**



1. A method of making a tear line-forming perforation in a sealed bag made of confronting panels of manually tearable material having marginal portions thereof sealed together to define a sealed compartment within the bag containing a material to be sealed, said method comprising the steps of: providing an outwardly tapering faceted pointed tool head, the faceted tapered pointed tool head being formed by at least three, longitudinal extenting bag material slitting edges converging at a bag-puncturing point at the end of the tool, positioning said bag-puncturing point substantially beyond what is or will be the inner margin of a sealed marginal portion thereof, and forcing the tool head through said bag with an orientation where the bag material slitting edges of the tool head form a multi-legged tear line-forming perforation which terminates outwardly of said inner margin and comprises continuous slits intersecting at a common point with one of the legs of the perforation extending from said common point in a direction away from the adjacent edge of the leg along a line which passes within the sealed portion of the bag, so that the bag is opened when it is torn from the edge thereof through and beyond the latter leg, and then withdrawing the tool head from the punctured bag.

4,176,568

BAND CUTTING APPARATUS

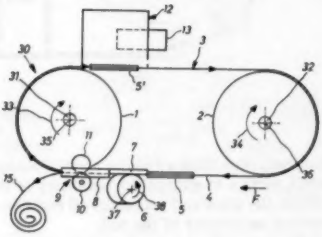
Erik G. Nilsson, Buchs, Switzerland, assignor to Swegen Maschinen AG, Buchs, Switzerland

Filed Apr. 26, 1978, Ser. No. 900,223

Claims priority, application Austria, Apr. 29, 1978, 3069/78

Int. Cl.[2] B23D *19/04*

U.S. Cl. 83—187 **10 Claims**



1. A band cutting apparatus for cutting a fabric web to produce a web-like article by the agency of a cutting means, whereby said fabric web is guided towards said cutting means, comprising a guide means including at least one fabric guide means provided with an uncurling means for uncurling an inwardly directed curl at the edge of said fabric, which fabric guide means is arranged relative to the direction of advancement of said fabric web ahead of said cutting means;

said uncurling means comprising a slot means extending obliquely and oppositely to the direction of advancement of said fabric web, said slot allowing said edge of said fabric to pass through said uncurling means;

said uncurling means also comprising two arms constituting a run-up means arm and a run-down means arm extending substantially parallel thereto whereby said two arms are separated from each other by said slot means;

and said uncurling means and said slot means respectively comprising a first section and a second section disposed at an angle to each other whereby said first section is arranged closer to the fabric edge at which the fabric can curl than the second section, and whereby said first section defines with said edge of said fabric a first small angle and said second section defines with said edge of said fabric a second, larger angle.

4,176,569

MULTIPLE WOUND ROLL DISPENSER FOR FLEXIBLE SHEET MATERIAL

Raymond F. DeLuca, Stamford, Conn., assignor to Georgia-Pacific Corporation, Portland, Oreg.

Filed Apr. 18, 1978, Ser. No. 897,431

Int. Cl.[2] A47K *10/36, 10/38*

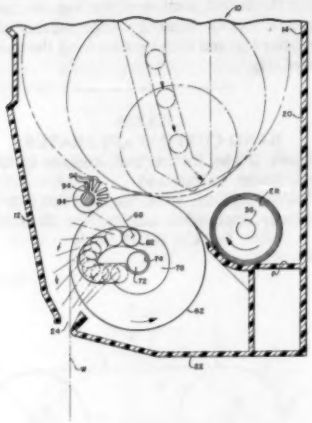
U.S. Cl. 83—337 **23 Claims**

1. A dispenser for wound rolls of flexible sheet material that

have supporting spindles projecting outwardly from the roll core ends comprising:

a dispenser housing to receive the rolls to be dispensed having inwardly facing tracks on the opposite inner side walls of said housing for the rolls to move downwardly within said tracks with the lower end section of each track slanting away from the longitudinal axis of the main length of the track,

roll driving guide means pivotally mounted adjacent the lower end of each said track with means biasing said guide means inwardly toward the center of the track, each said



guide means providing a friction surface along each slanting track section to engage the periphery of the roll spindle within the track and promote roll rotation during said downward movement of the roll,

a feed roller rotatably mounted within said dispenser housing adjacent the lowermost ends of said tracks so that the periphery of a roll having the spindle therefor engaged by said guide means will engage and be driven by rotation of said feed roller, and

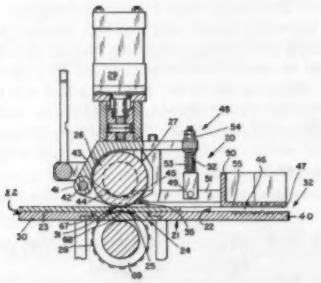
means for leading sheet material leaving said feed roller out of said dispenser housing to a user.

4,176,570

DICER WITH SOFT FEED APPARATUS

Clement A. Hutchins, Andover, Mass., assignor to Bolton-Emerson, Inc., Lawrence, Mass.

Filed Jun. 5, 1978, Ser. No. 912,762
Int. Cl.[2] B23D *25/00*
U.S. Cl. 83—355 **7 Claims**



1. In a dicer of the type having a horizontal feed platform, a pair of feed rolls having a web feed nip at the platform entrance means for applying roll pressure at said nip; a toothed bed knife and a toothed rotary cutter forming a pellet cutting nip at the platform exit and a plurality of web hold down fingers in the space between said nips the combination of;

a plurality of closely spaced, fine ribs and grooves formed in the upper surface of said horizontal feed platform and extending in the direction of feed of a web there along;

a plurality of closely spaced, fine ribs and grooves formed in the lower surface of said web hold down fingers and extending in the direction of feed of said web;

said ribs and grooves preventing sidewise movement of a web of plastic fed by said rolls across said platform into said pellet cutting nip without requiring undue nip pressure at said feed rolls;

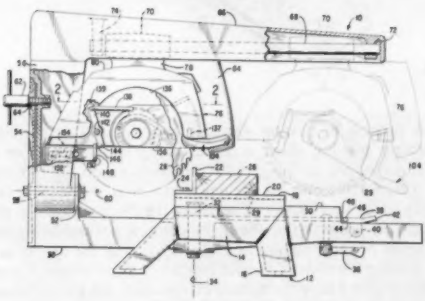
and a pattern of diamond shaped protuberances on the lower feed roll of said pair for preventing wrap around of said roll by webs of limp material.

4,176,571

GUARD MECHANISM FOR RADIAL SAW

William A. Batson, Pickens, S.C., assignor to The Singer Company, New York, N.Y.

Filed Jan. 18, 1978, Ser. No. 870,533
Int. Cl.[2] B27B *5/20, 5/29;* B27G *19/04*
U.S. Cl. 83—397 **12 Claims**



1. A guard mechanism for a radial saw having a motor powered saw blade mounted in a housing slidable on a support arm of a frame shiftable between a rearwardly non-cutting position and a forwardly cutting position wherein the blade will engage a workpiece lying on a work table connected to the frame, said guard mechanism comprising:

(a) a guard for covering a portion of the blade,

(b) the guard pivotally mounted to the housing, and

(c) means carried by the housing to contact the frame and to raise the guard away from the work table upon the housing being shifted to its rearwardly non-cutting position.

4,176,572

DEVICE FOR SCORING WOOD PANELS PRIOR TO SAWING

Charles A. Pennington, 4626 Valencia Dr., La Verne, Calif. 91750

Filed Jan. 23, 1978, Ser. No. 871,608
Int. Cl.[2] B27G *19/04*
U.S. Cl. 83—862 **10 Claims**

1. A scoring device for a wood panel or like workpiece, comprising:

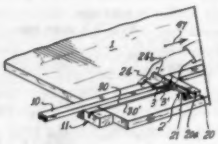
a guide bar adapted to guide a saw to saw said workpiece along a predetermined kerf line,

means to clamp said bar to said workpiece parallel to said kerf line,

a scoring device frame having a guided portion configurated to fit onto said guide bar and slidable therealong,

an outboard extension portion of said frame extending generally parallel to the workpiece at substantially a right angle to said guide bar,

a pair of knife-carrying means mounted on said extension portion and adjustable in position therealong,
a scoring knife blade attached to each said knife-carrying means,
whereby said knife blades may be adjusted to score simultaneously along either side of said kerf line, said scoring preventing splintering of the surface of said workpiece by said saw,
each said knife-carrying means comprises knife blade arm means having a shaft hole,
shaft means extending through each said shaft hole,
a support in said guided portion of said frame receiving rotatably an inboard end portion of said shaft means,



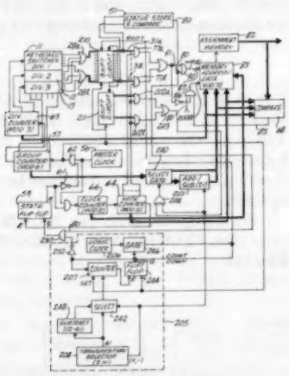
a bearing suppport in said outboard extension portion of said frame receiving rotatably an outboard end portion of said shaft means,
clamping means to secure each said arm means to said shaft at a selected position along the length of said shaft means,
a resilient clip extending generally around said arm means to hold said knife blade against its side, said blade having a first hole through its side portion,
a first boss on said arm engaging said hole,
a cut in said clip along a side portion thereof and a second hole adjacent said cut, and
a second boss on said arm engaging said second hole releasably to retain said clip along the length of said arm.

4,176,573

INTRAKEYBOARD COUPLING AND TRANSPOSITION CONTROL FOR A KEYBOARD MUSICAL INSTRUMENT

Ralph Deutsch, Sherman Oaks, Calif., assignor to Kawai Musical Instrument Mfg. Co. Ltd., Hamamatsu, Japan

Filed Oct. 13, 1978, Ser. No. 951,168
Int. Cl.² G10B *3/20*; G10C *3/28*; G10H *1/00*
U.S. Cl. 84—1.01 **11 Claims**



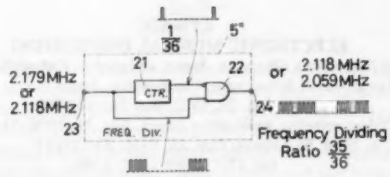
1. In a keyboard switch and assignor circuit of the type in which keys of the keyboard are arranged in groups, each group corresponding to the notes of one octave, the groups being scanned in sequence in synchronism with a master clock, the status of each of the keys of each group as it is scanned being read out in binary form on a corresponding number of parallel output lines, the current status information on each of said lines being compared with the prior status stored in a group of registers to indicate when a key has changed status, a change in status of any of the keys in a group when scanned causing a word identifying the note associated with the key to be stored or cleared in an assignment memory depending on whether the change in status indicates a key has been activated or released, the word stored in the assignment memory identifying the key by note and octave, apparatus for transposing the notes associated with the keys of the keyboard by a selected number of half tones, comprising: shifting means interconnecting the parallel status lines with the status storing registers, means generating electrically coded signals indicating the number of musical half tones to be transposed, and means responsive to said coded signals for setting the shifting means to switch the current status signals on each of the lines to a different one of said status storing registers.

4,176,574

FREQUENCY DIVIDER FOR TONE SOURCE APPARATUS FOR ARABIAN SCALE IN ELECTRONIC ORGAN

Tsunehisa Nogimura, Okegawa, Japan, assignor to Kabushiki Kaisha Kawai Gakki Seisakusho, Hamamatsu, Japan

Filed Oct. 13, 1978, Ser. No. 951,605
Int. Cl.² G10H *5/06*
U.S. Cl. 84—1.01 **4 Claims**



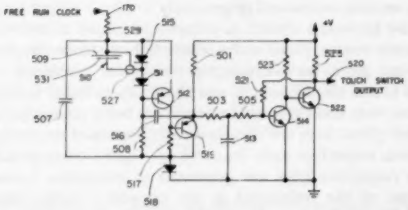
1. A tone source for an Arabian scale comprising a frequency divider including a counter, an AND circuit including two input terminals and an output terminal, and an input terminal connected through the counter to one of said input terminals of the AND circuit and connected directly to the other input terminal of the AND circuit, said counter being a 36 counter such that for every thirty-six input pulses to said counter thirty-five output pulses are produced to obtain musical tone signals at said output terminal which are lower in frequency by 50 cents.

4,176,575

IMPROVED TOUCH OPERATED CAPACITANCE SWITCH CIRCUIT FOR AN ELECTRONIC ORGAN

Walter Munch, Fort Thomas, Ky., assignor to D. H. Baldwin & Company, Cincinnati, Ohio

Filed Jun. 21, 1977, Ser. No. 808,607
Int. Cl.² G10H *1/00, 5/00*
U.S. Cl. 84—1.01 **3 Claims**



1. A touch operated capacitance switch arrangement for use

in connection with an electronic musical instrument having a plurality of modes of operation comprising:

a touch electrode;

a guard electrode interposed between said touch electrode and nearest points of ground potential;

a source of alternating voltage;

circuit means for applying said alternating voltage to said guard electrode and said touch electrode, said guard electrode cooperating with said alternating voltage to reduce the capacitance of said touch electrode to ground; said circuit means further comprising;

means to detect increased current flow to said touch electrode when said touch electrode is touched by a human extremity; and

an output terminal connected to said means to detect, said output terminal caused to have a voltage potential at a first state by said detector means when said touch electrode is not touched, and caused to have a voltage potential at a second state by said detector means when said touch electrode is touched, said output terminal connected to said electronic musical instrument such that the mode of operation of said electronic musical instrument is changed when said voltage of said output terminal goes from said first state to said second state.

4,176,576

ELECTRONIC MUSICAL INSTRUMENT

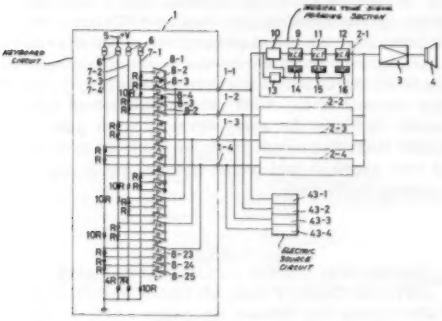
Keiji Murakami, Okegawa, Japan, assignor to Kabushiki Kaisha Kawai Gakki Seisakusho, Hamamatsu, Japan

Filed Sep. 20, 1977, Ser. No. 834,882

Claims priority, application Japan, Sep. 21, 1976, 51-112492; Oct. 6, 1976, 51-119434; Oct. 25, 1976, 51-127327

Int. Cl.[2] G10H *1/02, 5/00*

U.S. Cl. 84—1.01 **7 Claims**



1. An electronic musical instrument comprising: a keyboard with keys; a keyboard circuit connected to said keyboard for generating scale tone voltage signals corresponding to depressed keys of the keyboard; plural musical tone signal forming sections connected respectively to plural output terminals of the keyboard circuit; said keyboard circuit comprising: an electric source, plural series-connected resistance circuits each having plural series-connected resistances connected at one end to said electric source, and plural key-switches arranged to move with said keys, said key-switches being connected so that when plural keys are simultaneously depressed according to a chord, respective scale tone voltage signals corresponding to the respective keys are generated at respective connecting points of the resistances in the respective series-connected resistance circuits and may be respectively transmitted from said plural output terminals.

4,176,577

ELECTRONIC MUSICAL INSTRUMENT OF WAVESHAPE MEMORY READING TYPE

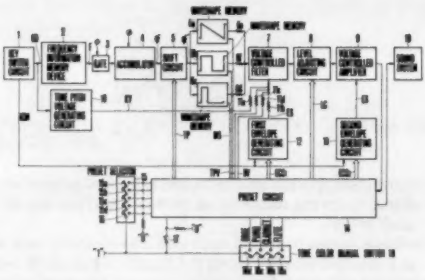
Shigeru Yamada, and Kiyoshi Ichikawa, both of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Oct. 27, 1977, Ser. No. 845,870

Claims priority, application Japan, Oct. 30, 1976, 51-130733; Oct. 30, 1976, 51-130734; Oct. 30, 1976, 51-130735; Oct. 30, 1976, 51-130736; Oct. 30, 1976, 51-130737; Oct. 30, 1976, 51-130738

Int. Cl.[2] G10H *1/02, 5/00*

U.S. Cl. 84—1.01 **9 Claims**



1. An electronic musical instrument comprising a key switch circuit providing output signals representative of depressed keys, a frequency information memory device responsive to the key switch circuit output signals which stores frequency information corresponding to depressed keys, a plurality of musical tone forming means including a waveshape memory device for forming musical tones in response to the information stored in said frequency information memory device, a shift circuit interposed between said frequency information memory device and said musical tone forming means for effecting a footage change of an octave unit, a preset circuit for applying a plurality of preset footage change signals to said shift circuit and for applying other preset signal necessary to form said musical tones to said musical tone means, and a manually operable preset selector for simultaneously determining said preset signals necessary to form said musical tones to said musical tone forming means, and a manually operable preset selector for simultaneously determining said preset signals.

4,176,578

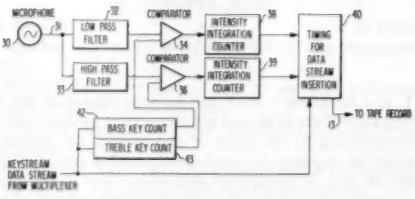
SYSTEM FOR ENCODING OF BASS AND TREBLE EXPRESSION EFFECTS WHILE RECORDING FROM THE KEYBOARD OF AN ELECTRONIC PLAYER PIANO

Joseph M. Campbell, Lewisburg, and Larry J. Minyard, Columbia, both of Tenn., assignors to Teledyne Industries, Inc., Los Angeles, Calif.

Filed Aug. 26, 1977, Ser. No. 828,070

Int. Cl.[2] G10F *5/00*; G10G *3/04*

U.S. Cl. 84—115 **9 Claims**



1. In a method for recording bass and treble expression effect

signals in binary form, respectively, for recreating a musical performance on an electronic player piano wherein serial frames of data cells are provided in a sequence of time division multiplexed frames of data, each frame carrying therein a first group of data bits corresponding to key note actuations of the bass notes on a piano and second group of data bits corresponding to the key note actuations of the treble notes on said piano,

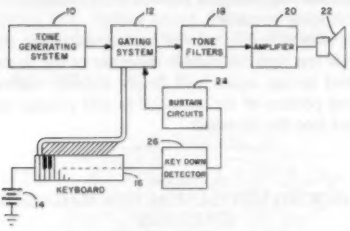
the improvements wherein said first and said second groups of data cells are spaced from each other within said time frame, and

inserting (1) said bass expression effect signal in binary form in said time division multiplexed frames of data cells in advance of the group of data cells receiving said data bits corresponding to key note actuations of said bass notes and (2) said treble expression effect signal in binary form in said time division multiplexed frames of data cells in advance of the group of data cells receiving said data bits corresponding to key note actuations of said treble notes so that upon recreation of the original musical presentation on said electronic player piano a more faithful rendition of the original performance is produced.

4,176,579
CIRCUIT FOR SIMULATING REVERBERATION IN ELECTRONIC ORGANS

Richard H. Peterson, 11748 Walnut Ridge Dr., Palos Park, Ill. 60464

Filed May 24, 1977, Ser. No. 800,109
Int. Cl.[2] G10H *1/02*
U.S. Cl. 84—1.24 **4 Claims**



1. In an electronic organ having a keyboard, and a plurality of tone generators, one for each note to be sounded,

a like plurality of time constant circuit means, one associated with each of said notes, for establishing a predetermined first decay characteristic for each note,

a key-down detector for sensing the key-down condition of any key of the keyboard,

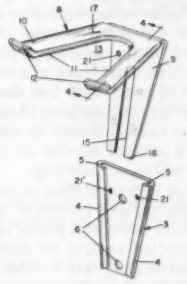
a like plurality of auxiliary circuit means connected one to each of said time constant circuit means and to said key-down detector and operative in response to said key-down detector to cause the sounded notes to have said predetermined first decay characteristic so long as any key of the keyboard is in its key-down position and to cause the sounded notes to have a second decay characteristic having a decay period shorter than the decay period of said first decay characteristic when all keys of the keyboard are in the key-up position.

4,176,580
SUPPORTING BRACKET FOR MUSICAL INSTRUMENTS

Manuel Gallegos, 3734 Franklin, Denver, Colo. 80205

Filed Mar. 6, 1978, Ser. No. 883,525
Int. Cl.[2] G10G *5/00*
U.S. Cl. 84—327 **4 Claims**

1. A supporting bracket for mounting guitars and other stringed musical instruments having finger board portions above a floor surface and selectively at hanging or tilted angles relative to a support having vertical or horizontal wall surfaces comprising a flat generally V-shaped wall mounting plate having its opposing side edges bent outwardly and inwardly to form side channels extending end to end and selectively attachable by attaching means to said vertical and horizontal wall surfaces, a generally inverted L-shaped angular supporting bracket including a vertical converging flat base portion and a horizontally extending flat hanger plate portion formed on the upper end of said flat base portion and projecting at generally right angles relative thereto, said hanger plate portion having two spaced flat converging arms providing a generally U-shaped open area therebetween with a generally concave inner end, said base portion having an elongated slot therein extending from the lower end thereof to a point spaced below the upper end whereby said base portion is sleevable within said

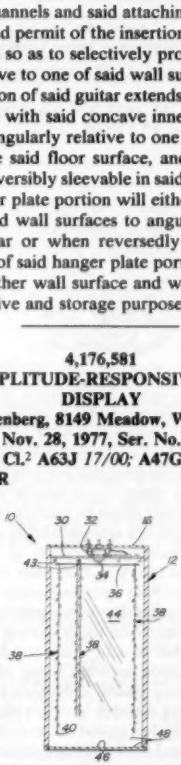


mounting plate channels and said attaching means will project within said slot and permit of the insertion and removal of said base plate portion so as to selectively project outwardly from or inwardly relative to one of said wall surfaces, whereby said finger board portion of said guitar extends between said spaced arms and engages with said concave inner end and is thereby fixedly retained angularly relative to one of said wall surfaces and spaced above said floor surface, and whereby said base plate portion is reversibly sleevable in said wall mounting plate so that said hanger plate portion will either project outwardly from either of said wall surfaces to angularly and outwardly support said guitar or when reversedly sleeved therein the converging arms of said hanger plate portion will extend over and engage the other wall surface and will not project therefrom for inoperative and storage purposes.

4,176,581
AUDIO AMPLITUDE-RESPONSIVE LIGHTING DISPLAY

Bernard R. Stuyvenberg, 8149 Meadow, Warren, Mich. 48089

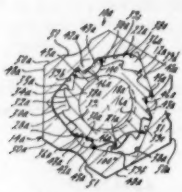
Filed Nov. 28, 1977, Ser. No. 855,413
Int. Cl.[2] A63J *17/00*; A47G *33/16*
U.S. Cl. 84—464 R **3 Claims**



1. In a system for varying the intensity of a plurality of lights in accordance with plural channel audio amplitude signals, a display comprising:

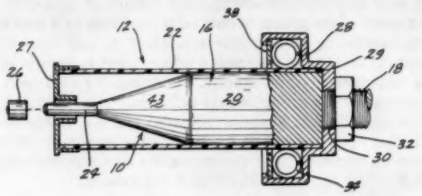
a microphone responsive to ambient sound;
an audio amplifier for amplifying said ambient sound and directing said amplified sound energy to a plurality of audio amplitude responsive channels;
a plurality of colored spotlights directable against the walls and ceiling of a room in which said system is operated, the intensity of said spotlights responsive to said sound amplitude;
a housing having multi-sided prismatic openings through which light paths are provided to permit the passage of light from the interior of said housing, said housing having a top wall, a mirrored back wall and a mirrored bottom wall;
a plurality of banks of lights, each of said banks being responsive to a separate one of the channels of audio amplitude signals, each of said banks including a plurality of lights, each of said banks being responsive respectively to the amplitude of an associated channel of audio sound signals, each of said banks including a plurality of sets connected in parallel, each set being of a selected number of lights connected in series with one flasher unit, said lights being responsive to said separate channels and being turned on and off in a random fashion by said flasher units;
means for mounting a selected number of said banks in a stationary position within said housing;
a motor mounted to the interior surface of said top wall;
a laterally disposed arm member carried by said motor and rotatable in a generally horizontal plane; and
means mounting a selected number of said banks to the opposite ends of said rotating arm member to rotate said last-mentioned banks about a vertical axis.

4,176,582
TORQUE LIMITING NUT ASSEMBLY
Erwin C. Witte, Placentia, Calif., assignor to Microdot Inc., Greenwich, Conn.
Filed Feb. 10, 1978, Ser. No. 876,653
Int. Cl.[2] F16B *31/02*
U.S. Cl. 85—61 **7 Claims**



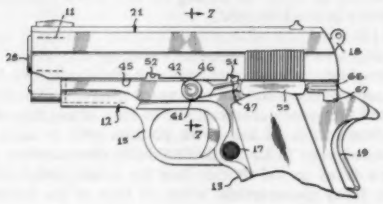
1. A torque limiting nut assembly comprising: a threaded nut member, a wrenching member having an external surface adapted to be engaged by a wrench and having a central opening adapted to receive said threaded nut member, said threaded nut member having a plurality of axially extending fingers circumferentially disposed about its outer surface, each of said fingers having a ramp on one side defined by a radially extending surface inclined radially outwardly in the direction of rotation for application of said nut member onto an associated bolt member, said wrenching member having at least one tooth extending from three generally equiangularly spaced sides of said central opening, each said tooth having a ratchet surface generally similar to that of said ramp and being engageable therewith, said wrenching member being of a resilient construction and permitting elastic deformation of said central opening, said wrenching member having a plurality of external flats defining a generally hexagonal outer surface adapted to be gripped by a wrench and with alternate ones of said flats being generally in radial alignment with an associated one of each said tooth, said alternate ones of said flats having recesses extending radially inwardly at said associated one of each said tooth to define areas of preselected reduced sections, whereby each said tooth can ratchet over said fingers with said central opening expanding in the area of each said tooth at a preselected torque on said wrenching member.

4,176,583
DEVICE FOR CONDITIONING EXPENDED SHOTSHELLS
Frederick A. Lage, Rte. 2, Gladbrook, Iowa 50635
Filed Feb. 13, 1978, Ser. No. 877,125
Int. Cl.[2] F42B *33/00*
U.S. Cl. 86—24 **5 Claims**



1. A shotshell reconditioner, comprising,
a first support means,
a swedge means secured to said support means and extending therefrom for insertion into the partially crimped portion at the discharge end of the shotshell,
and a ring-shaped spring means mounted to said support means adapted to embrace and engage the exterior portion of said shotshell as said swedge means is inserted into the shotshell whereby said spring means will substantially smooth the said crimped portion as to facilitate a subsequent loading operation,
said ring-shaped spring means having an inside diameter which is less than the outside diameter of the shotshell so that said spring means will firmly slidably embrace the crimped portion of the shotshell as said swedge means is inserted into the shotshell.

4,176,584
SLIDE LOCKING MECHANISM FOR MAGAZINE-FED FIREARMS
Frank S. Thomas, Jr., deceased, late of West Covina, Calif., and by Phyllis Thomas, executrix, 2122 Pearl St., Santa Monica, Calif. 90405
Filed Jun. 21, 1978, Ser. No. 917,417
Int. Cl.[2] F41D *11/06*
U.S. Cl. 89—138 **20 Claims**



1. In an automatic or semi-automatic magazine-fed firearm having a barrel fixed to a frame; a slide surrounding said barrel and with the breech thereof defining a cartridge receiver, said slide being reciprocably mounted to said frame for axial movement thereon between a firing chamber-sealing battery position at the muzzle-end of the frame and a full-recoil position at the other end of the frame; resilient means acting between said frame and said slide, urging said slide towards said battery position; and a cartridge magazine releasably insertable into said frame, said magazine including a cartridge-supporting follower and resilient means urging said follower into the path of movement of said slide; slide locking means comprising:

a lever rotatably mounted to said frame and having first caming means formed thereon;

first detent means on said slide, cooperatively engaging said first caming means with said slide in said battery position and thereby restraining said slide against movement out of said battery position;

second caming means on said lever, positioned in the path of movement of said slide; and

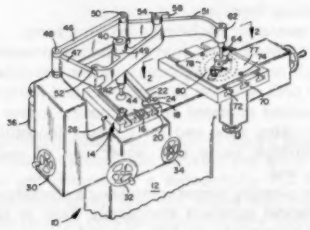
cam engaging means on said slide, cooperatively engaging said second caming means in response to movement of said slide into said battery position, for rotating said lever and thereby forcing said first caming means into cooperative engagement with said first detent means, whereby movement of said slide out of said battery position upon discharge of a cartridge is delayed until the gases in said barrel produced by such discharge exit the muzzle, thereby reducing the gas pressure within the barrel to a predetermined safe level.

4,176,585

UNIVERSAL PANOGRAPH PATTERN

Rodney L. Anderson, Fullerton, Calif., assignor to Creative Tool Specialties, Inc., Balboa Island, Calif.

Filed Sep. 16, 1977, Ser. No. 834,062
Int. Cl.² B23Q *35/44*
U.S. Cl. 409—125 **2 Claims**



1. A variable pattern for guiding a stylus on a pantograph along a preselected path comprising:

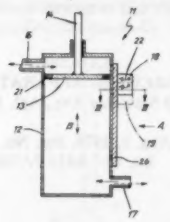
a plate for attachment to a table on a pantograph, an elongated arm having pivot means intermediate the ends thereof, said pivot means connecting said arm to the plate for movement about the axis of said pivot means, said plate including a plurality of index means spaced apart a predetermined distance in a circular pattern concentric with the axis of said pivot means, engagement means supported on said arm and being engagable with the index means for positioning the arm at a selected one of said index means, stylus holder means being slidably supported on said arms for movement along the length thereof, limit means slidably supported on said arm on each side of said stylus holder means, each of said limit means being releasably fixable along said arm for limiting the travel of the stylus holder means therealong, roller bearing means mounted on said arm and spaced from said pivot means and in engagement with said plate for supporting the arm on the plate, and said stylus holder means having bearing means for receiving a stylus and allowing the stylus to move freely therein relative to the stylus holder means.

4,176,586

PISTON AND CYLINDER DEVICE

Kurt Stoll, Lenzhalde 72, Esslingen, and Manfred Rüdle, Thomasächkerweg 17, Esslingen-Berkheim, both of Fed. Rep. of Germany

Continuation of Ser. No. 654,044, Jan. 30, 1976, abandoned. This application Jul. 28, 1977, Ser. No. 819,858
Claims priority, application Fed. Rep. of Germany, Jan. 31, 1975, 7502826
Int. Cl.² F01L *25/08, 31/00;* F01B *31/12*
U.S. Cl. 92—5 R **4 Claims**



1. A piston and cylinder device comprising

an elongated hollow enclosed cylinder having an exposed outer surface;

a piston positioned within said cylinder and capable of reciprocating movement along the elongation direction thereof based on working medium input into said cylinder;

an elongated mounting element positioned on the outer surface of said cylinder and extending parallel to the elongation direction thereof, said elongated mounting element including an elongated base and two elongated webs connected to said base and extending away therefrom in a V-shaped fashion along the elongation direction of said base;

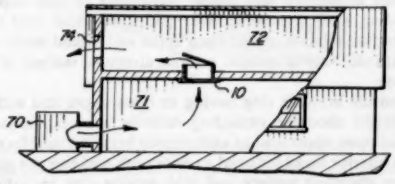
two limit switches mounted on said mounting element, each being respectively mounted on one of said elongated webs so as to be independently movable along the elongation direction of said mounting element and thus said cylinder, each of said two limit switches being activated by movements of said piston past their positions and capable of controlling the admission of working medium into said cylinder and thus the movement of said piston therewithin.

4,176,587

VENTILATING DAMPER ASSEMBLY

Howard W. Cox, Tempe, Ariz., assignor to Mission Marketing Corporation of Arizona, Tempe, Ariz.

Continuation-in-part of Ser. No. 710,920, Aug. 2, 1976, Pat. No. 4,047,475. This application May 27, 1977, Ser. No. 801,082
The portion of the term of this patent subsequent to Sep. 13, 1994, has been disclaimed.
Int. Cl.² F04D *25/08, 25/14;* F24F *7/00, 13/00*
U.S. Cl. 98—116 **2 Claims**



1. In a building of the type cooled by an evaporative cooling

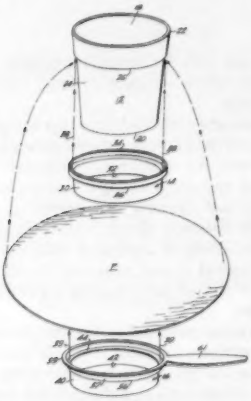
system, having an enclosed living space with a ceiling an enclosed attic above the ceiling, a vent establishing communication between the attic and the atmosphere outside the building, and an evaporative cooling means for continuously drawing air from outside the building through such cooling means and discharging such air into said living space, an improvement comprising a normally closed pressure-actuated ventilating damper assembly located in the ceiling between said living space and said attic and adapted to open in response to greater air pressure within the living space than in the attic to discharge air from the living space through said vent and the attic to the outside of the building whenever air is discharged into the building through said evaporative cooling means.

4,176,588

BREWING APPARATUS

Barnett Baron, 1009 Meridian Ave., Apt. 19, Miami Beach, Fla. 33139

Filed Aug. 1, 1978, Ser. No. 929,919
Int. Cl.[2] A47J *31/06*
U.S. Cl. 99—323 **11 Claims**



1. A brewing apparatus comprising:

I. a brewing cup having a mouth rim comprising a first abutment surface, and said rim defining an open upper end, said cup including an annular exterior shoulder extending radially outwardly forming a second annular abutment surface adjacent to and axially spaced from said rim, an annular upper side wall extending from said shoulder to said open upper end, said cup having a closed lower end and an annular lower side wall extending axially from said shoulder to said lower end, said lower side wall being of a maximum cross sectional area at said shoulder;

II. a brewing holder comprising:

an inside brewing ring including an open upper end with an exterior shoulder spaced axially from said upper ring end forming an annular ring abutment surface, said inside ring including a skirt portion extending axially away from said inside ring shoulder and upper end, said inside ring being sized to receive said closed lower end of said cup for sliding axial movement over said lower wall into snug abutting relation of said open upper end of said inside ring with said second annular exterior abutment surface of said cup;

an outside brewing ring having an open upper end with an interior shoulder extending radially inwardly adjacent said open upper end of said outside brewing ring forming an interior shoulder sized to mate with said exterior shoulder abutment surface and said outside ring including a skirt extending axially downwardly from said inside ring shoulder, said outside ring being sized to receive the closed lower end of said cup and said inside brewing ring skirt with the interior shoulder in snug abutting relation with the exterior shoulder of said inside brewing ring,

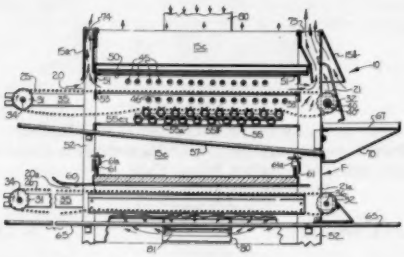
said brewing filter holder being adapted to be nestled about said cup with the open upper end of said outside ring in abutting relation with the exterior shoulder of said cup for forming and shaping a pliable filter paper to conform generally to the shape of the exterior of said lower cup wall and said inside ring being adapted to captivate the filter paper in the formed and shaped configuration when the outside ring is about the cup and paper and the interior shoulder of the outside ring is in mating abutting engagement with the annular inside ring abutment surface and said rings are in telescoping relation with one another and with said cup.

4,176,589

COOKING APPARATUS

Robert M. Stuck, Clover, S.C., assignor to Marshall Air Systems, Inc., Charlotte, N.C.

Filed Feb. 27, 1978, Ser. No. 881,590
Int. Cl.[2] A47J *37/06*
U.S. Cl. 99—386 **13 Claims**



1. A cooking apparatus comprising:

housing means for enclosing a cooking zone,

endless foodstuff chain conveyor means mounted to extend through said cooking zone and for movement along a closed path of travel having upper and lower runs,

heating means mounted in said housing means for heating said cooking zone and for cooking foodstuff conveyed therethrough along said upper run of said conveyor means, and

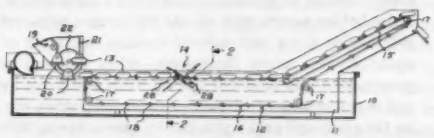
conveyor cleaning means comprising a plurality of generally cylinderical members stationarily fixed in said housing means to extend generally parallel one to another in a generally horizontal array underlying said lower run for engaging said conveyor means along said lower run and for guiding said engaged conveyor means in a sinuous path for facilitating dislodging therefrom any adhering foodstuff.

4,176,590

DOUGHNUT FRYING APPARATUS

Kenneth Kochan, Burlington, Vt., assignor to Automated Donut Systems, Inc., Winchester, Mass.

Filed Aug. 7, 1978, Ser. No. 931,387
Int. Cl.[2] A47J *37/12*
U.S. Cl. 99—405 **3 Claims**



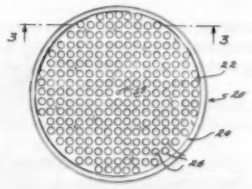
1. Apparatus for use in frying doughnuts, said apparatus

including a tank for hot oil, an endless conveyor within said tank and extending lengthwise thereof and including transverse flights, the upper course of said conveyor traveling from a pick-up zone adjacent the rear end of the tank towards the other end thereof with the flights at a level to engage and convey floating doughnuts then to ensure their advance, each two flights defining a space for a transverse series of doughnuts, means midway of the conveyor operable to raise the doughnuts in one space and deposit them other side up in the next adjacent forward space, said means including a transverse shaft in said tank and rotated by said conveyor, diametrically opposed doughnut receivers carried by said shaft and defining an acute angle, each receiver including leading and trailing vanes and having as the shaft turns a first position in which the leading vane is above the trailing vane below the conveyor space next to the shaft on the side thereof towards which the doughnuts advance, the trailing vane passing upwardly through said space, as the shaft turns, to pick up doughnuts therein and carry the picked up doughnuts until they topple forwardly onto the leading vane, other side up, then to be lowered into said next forward conveyor space as said leading vane passes downwardly therethrough into a second receiver position in which the trailing vane is above the last named space.

4,176,591
COOKING PAN FOR BAKING PIZZA PIES AND LIKE FOOD PRODUCTS

Douglas P. Power, 1131 N. Westgate, Springfield, Mo. 65802

Filed Apr. 10, 1978, Ser. No. 894,744
Int. Cl.[2] A21B *3/13*; A47J *27/00, 36/00*
U.S. Cl. 99—430 **6 Claims**



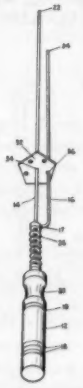
1. An improved cooking pan for use in baking pizza pies and like crusted food products, said cooking pan being unitary in construction and comprising a substantially flat metal wall portion of predetermined size and shape, said wall portion being of a thickness of between approximately 0.040 and 0.063 inch and having opposed top and bottom surfaces, said wall portion having a plurality of perforations therethrough uniformly distributed throughout the entire extent thereof, wherein the ratio of the total perforated surface area of said wall portion to the total surface area thereof being between approximately 15 to 40 percent, each of said perforations having an upper edge that is filleted, said perforations being round holes arranged in angularly related rows and columns over said metal wall portion, the diameter of said holes being in a range from approximately one-fourth to three-eights inch, and a peripheral pan portion extending upwardly from around the wall portion at an angle thereto whereby the peripheral portion forms a continuation of the wall portion.

4,176,592
SKEWER

Charles E. Doyle, Jr., 940 Sargent, SE., Ada, Mich. 49301

Filed Mar. 10, 1978, Ser. No. 885,292
Int. Cl.[2] A47J *37/04*
U.S. Cl. 99—419 **3 Claims**

3. A skewer comprising:
a substantially cylindrical handle with a convex depression near one end thereof;
a first shaft axially mounted at the end of the handle near the convex depression, the first shaft having a pointed free end and a radially extending flange at the pointed end;
a second shaft having one coiled end with a plurality of coils snugly wrapped about the first shaft for sliding therealong, the coils abutting the flange when the second shaft is in an extended position with respect to the first shaft for preventing the coiled end from sliding off the pointed end of the first shaft;
the opposite end of the second shaft having a point;
the second shaft being spaced apart and substantially parallel to the first shaft;
a transverse radially extending portion of the second shaft connecting the parallel portion to the coiled end;

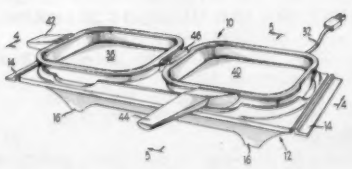


a plate having a central aperture and a plurality of secondary apertures spaced circumferentially about the central aperture;
the central aperture and each second ary aperture spaced apart a distance equal to the distance between the two shafts;
the central aperture sized to receive one shaft and secondary apertures sized to receive the other shaft;
the plate slidable along the shafts and adapted to abut food skewered on the shafts and manually movable to slide the food off the skewers;
markings on the plate adjacent each secondary aperture to distinguish each secondary aperture.

4,176,593
COOKING DEVICE

Rouben T. Terzian, Chicago, Ill., assignor to Marvin Glass & Assoc., Chicago, Ill.

Filed Aug. 14, 1978, Ser. No. 933,266
Int. Cl.[2] A47J *37/10*
U.S. Cl. 99—422 **8 Claims**



1. A food preparation device, comprising:
heat conductive means for conducting heat and providing a support surface;
means for heating said heat conductive means;
means for containing food including first and second conductive pans, said pans being removably mounted in heat

conductive relationship on said heat conductive means; and

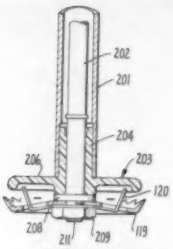
hinge means defined on said heat conductive means for hingedly connecting (said containing means) at least one of said pans to said heat conductive means, said hinge means comprises a slotted flange on said pan and a pair of adjacent, upwardly directed flanges on said heat conductive means for alternate insertion into said slotted flange.

4,176,594

LIVE KNIFE ASSEMBLY

John H. Amstad, Alameda, Calif., assignor to Atlas Pacific Engineering Company, Emeryville, Calif.

Filed Nov. 15, 1977, Ser. No. 851,640
Int. Cl.[2] A23N *7/00*
U.S. Cl. 99—593 **2 Claims**



1. An improvement in a cutting machanism which mechanism includes a shaft housing, a shaft positioned within the housing and extending outwardly of the housing at one end thereof, a rotary peeling knife mounted on the shaft one end for rotation with the shaft, a chip breaker mounted on the shaft one end and a guard mounted on the housing for cooperation with the cutter for adjusting the depth of a cut made by the cutter into a piece of fruit during a peeling operation, the improvement comprising:

a unitary guard having a planar portion, a guard rim surrounding said planar portion, said rim being arcuate and extending from said planar portion toward the cutter so that said guard rim closely follows an odd shaped portion of a fruit being peeled, a projection extending upwardly from said planar portion, said projection fitting snugly within the shaft housing so that rotation of said guard with respect to said housing is prevented, said projection having a bore defined therethrough which bore receives the shaft so that said extension provides a bearing for supporting the shaft within the housing, and means on said projection cooperating with means on the shaft for maintaining the shaft within the housing.

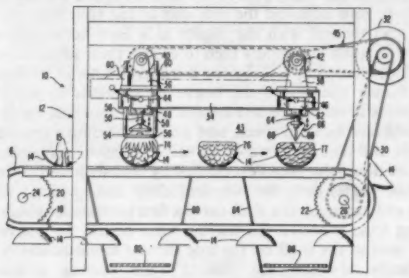
4,176,595

APPARATUS AND METHOD FOR CORING CAULIFLOWER HEADS

Richard A. Shaw, Watsonville, Calif., assignor to Richard A. Shaw, Inc., Watsonville, Calif.

Filed Jul. 25, 1977, Ser. No. 818,497
Int. Cl.[2] A23N *15/02;* A47J *21/00*
U.S. Cl. 99—638 **11 Claims**

1. Apparatus for removing the core from a cauliflower head comprising: a support; means on the support for conveying a cauliflower head along a predetermined path; a ring shiftably mounted on said support above the path for vertical movement into engagement with the head as the head moves along the path for holding the head on said conveying means; first cutter means adjacent to said ring for cutting the base of the head to remove the culls from the head as the head moves along said path and as the ring engages and holds the head on said conveying means; second cutter means spaced from the first cutter means and operable for cutting the remaining portion of the



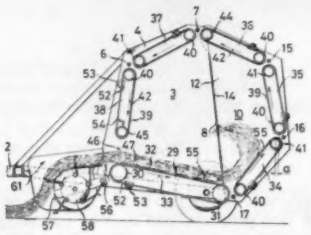
head into a number of parts; and means on the support for receiving each of said culls and said head parts, respectively.

4,176,596

MACHINE FOR FORMING A ROUND BALE OF FIBROUS AGRICULTURAL MATERIAL

Hans O. Sacht, Wolfenbüttel, Fed. Rep. of Germany, assignor to Gebrüder Welger, Wolfenbüttel, Fed. Rep. of Germany

Division of Ser. No. 762,483, Jan. 26, 1977, Pat. No. 4,119,026, which is a division of Ser. No. 612,104, Sep. 9, 1975, Pat. No. 4,009,653. This application Jul. 13, 1978, Ser. No. 924,282
Claims priority, application Fed. Rep. of Germany, Sep. 13, 1974, 2443838
Int. Cl.[2] B30B *5/06;* A01D *39/00*
U.S. Cl. 100—88 **19 Claims**



16. A machine for forming round bales of windrowed fibrous agricultural material and the like comprising a wheeled chassis for travel over a field, a cage-like frame having a horizontal central axis mounted on said chassis, said frame comprising a pair of upwardly extending side walls spaced apart in the horizontal direction, said side walls extending transversely of the horizontal central axis of said frame, conveying means extending between said side walls and combining with said frame to define a generally cylindrically shaped baling zone with said side walls defining the opposite ends of the baling zone and said conveying means defining the cylindrically shaped circumferential periphery of the baling zone for moving the agricultural material in the circumferential direction of the baling zone, said cage-like frame and said conveying means combining to form an inlet opening into the baling zone, said inlet opening having a lower side and an upper side with said conveying means receiving agricultural material through the inlet opening at the lower side and carrying it into the baling zone for forming a bale conforming to the cylindrically shaped configuration of the baling zone, wherein the improvement comprises that said conveying means are arranged for transmitting movement to the agricultural material for the full extent of said conveying means from the lower side of said inlet opening to adjacent the upper side of said inlet opening, said conveying means includes first members extending in substantially parallel relation with the horizontal central axis of the

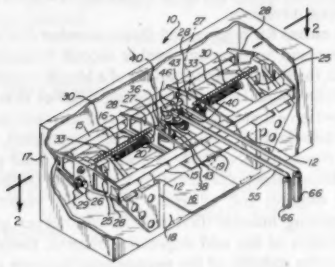
baling zone, said first members are journaled to said frame in a stationary position relative to the horizontal central axis, second members mounted on at least some of said first members and extending in the circumferential direction of the baling zone, said second members supported by and moving over said first members along a fixed path defined by the circumferential periphery of the baling zone.

4,176,597

MANUAL COMPACTOR

Grant E. Stevenson, Aurora, Colo., assignor to Nelson & Johnson Engineering, Boulder, Colo.

Filed Aug. 11, 1977, Ser. No. 823,565
Int. Cl.[2] B30B *1/20*
U.S. Cl. 100—244 **8 Claims**



1. A manual compactor comprising;
an enclosure having a door defined therein;
an elongated support structure positioned within the enclosure;
a pair of pressure plates having face portions, the pressure plates being slidably mounted for reciprocal movement relative to support structure with the face portions opposing one another;
a pair of screw members rotatably mounted to the support structure with one screw member adjacent each pressure plate;
a pair of nut members secured one each to each pressure plate and each engaging a screw member;
a pair of elongated handles rotatably mounted adjacent one another; and
ratchet means and drive means connecting the handle members through the drive means to the screw members, the screw members, nut members, ratchet means and elongated handles being arranged to move the pressure plates together when the handles are moved with opposite rotational sense;
whereby the rotation of the handle members rotates the screw members through the drive means and moves the pressure plates forcefully together.

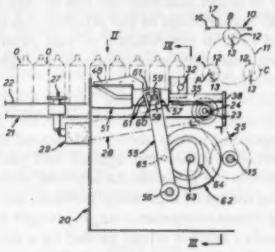
4,176,598

PRINTING MACHINES AND TRANSFER DEVICES THEREFOR

Jean-Louis Dubuit, 74 Boulevard Voltaire, 75011 Paris, France

Filed Oct. 14, 1977, Ser. No. 842,318
Claims priority, application France, Oct. 20, 1976, 76 31497
Int. Cl.[2] B41F *17/22*
U.S. Cl. 101—38 A **13 Claims**

1. A transfer assembly for a printing machine having a printing station, said transfer assembly comprising a transfer device, a feed conveyor for advancing in upright position objects to be printed in synchronism with said transfer device, said transfer device comprising a fixed shaft, a sleeve mounted for sliding movement along said shaft, a transfer member carried by said sleeve and having a pick-up position intersecting the path of movement of upright objects on said feed conveyor where a moving leading object is picked up by said transfer member in upright position from said feed conveyor, a follower and guide track arrangement coupled to said sleeve for imparting translational movement along said shaft and rotational movement about the axis of said shaft to said sleeve, a selected one of said follower and guide track being fixed relative to said sleeve and the other of said follower and guide track being fixed for



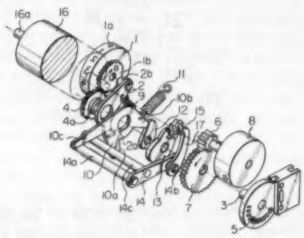
movement with respect to said sleeve, whereby in response to the displacement of said sleeve along said shaft said transfer means is rotationally displaced from its pickup position to a drop-off position for introducing in a recumbent position the object carried by said transfer member into said printing station.

4,176,599

DEVICE FOR INTERMITTENTLY DRIVING PRINTING RINGS IN A PRINTER

Katsuhiko Okabe, Tokorozawa, Japan, assignor to Copal Company Limited, Tokyo, Japan

Filed Aug. 31, 1977, Ser. No. 829,480
Claims priority, application Japan, Sep. 2, 1976, 51-118106[U]
Int. Cl.[2] B41J *1/22*
U.S. Cl. 101—95 **11 Claims**



1. In a device for driving printing character supporting means in a printer having control circuit means for issuing a printing selection command to initiate a printing operation in said printer, a plurality of printing character supporting means rotatable about a first axis, each said plurality of printing character supporting means including printing characters thereon, swingable levers each rotatably supporting the respective printing character supporting means and swingable about a second axis so as to move said printing character supporting means towards and against a platen and away therefrom, driving means for rotating each printing character supporting means about said first axis thereby permitting the respective printing character supporting means to be selectively moved towards and against said platen while the respective printing character supporting means is rotated so as to position a selected one of the printing characters at a printing position in cooperation with said platen upon receipt of said printing selection command from said control circuit of the printer so as to print said selected one of the printing characters to be printed onto a paper held between said printing character supporting means and said platen, the improvement wherein

each of said printing character supporting means being independent of each other,

each said printing character supporting means being rotatable by said driving means independently of said other printing character supporting means,

said driving means being controlled by driving pulses for rotation of said printing character supporting means intermittently to select said selected one of said printing characters and upon receipt of the printing character selection command to stop the rotation of said printing character supporting means and commence the swinging movement of said swingable levers,

means responsive to a printing signal for swinging said swingable lever supporting said respective printing character supporting means about said second axis for movement thereof towards and against said platen after said driving means has positioned a selected printing character supporting means at a printing position, and

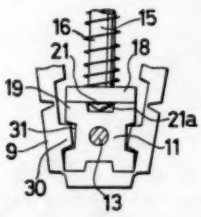
said driving means comprises a single plunger solenoid cooperating with a ratchet wheel guided by a driving shaft for driving said printing character supporting means, and another solenoid and a bell-crank lever associated therewith and said ratchet wheel and cooperating with said single plunger solenoid, said other solenoid being operative with said single plunger solenoid to control the speed of rotation of said printing character supporting means.

4,176,600

TYPE POSITIONING MECHANISM FOR PRINTING DEVICE

Yo Sato, Tokyo, Japan, assignor to Kabushiki Kaisha Sato, Tokyo, Japan

Filed Jan. 5, 1978, Ser. No. 867,006
Int. Cl.[2] B41J *1/20*
U.S. Cl. 101—111 **13 Claims**



1. A device for orienting the type faces on the stamp belts of a printing device, wherein said printing device is used for a label printing machine, or the like;

said printing device comprising:

a plurality of stamp belts each having an exterior and each carrying a plurality of types arrayed along its exterior;

a respective positioning member for each said stamp belt and around which each said belt passes and which each said belt engages; said positioning member being multisided, and including a first side, which is engageable with a thrust member and which is out of engagement with said belt, and second side pointing in a printing direction and being in engagement with said belt, such that a said type at said positioning member second side will be printed; said stamp belt being drawn securely around said positioning member, thereby to act in opposition to a biasing means; said positioning member being rotatably supported by said printing device and being rotatable such that every side of said positioning member is at one time a said first side and at another time a said second side;

said type face orienting device comprising:

a respective thrust member for each positioning member, each said thrust member having a first complementary formation on a side thereof facing toward said positioning member; said first complementary formation comprising a projection projecting toward said positioning member;

each said positioning member first side having a second complementary formation thereon with which said first formation is engageable in a complementary manner; said second complementary formation comprising a depression intermediate the length of the respective said first side of said positioning member and each said positioning member said first side having corner portions beyond both sides of said depression along the length of the respective said first side of said positioning member; the shapes of said first and second formations being complementary such that upon engagement therebetween, said projection is received in said depression; said projection narrows in shape toward the free and thereof, whereby said projection will be slidable into said depression for being held therein and said positioning member is rotated to a position at which its said second side always is aimed in said printing direction;

biasing means for biasing said thrust member first formation against said positioning member second formation;

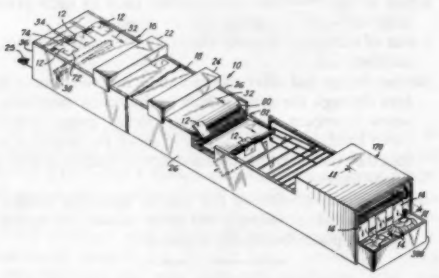
wherein the thrust member side is of a length to substantially span the length of said positioning member first side; said projection extending from said thrust member side toward and into said positioning member depression, whereby said thrust member side, at both sides of said projection therefrom along the length of that said thrust member side, engages and is biased against the respective said positioning member first side at said corner portions at both sides of the said depression therein, thereby to enhance the stability of the engagement between said thrust member side and said positioning member first side.

4,176,601

AUTOMATED TOWEL TRANSFER PRINTING, FEEDING, DRYING AND FOLDING APPARATUS

Sandor Szarka, Franklin Lakes, N.J., assignor to Precision Screen Machines, Inc., Hawthorne, N.J.

Filed Jun. 27, 1977, Ser. No. 810,375
Int. Cl.[2] B41F *15/12*
U.S. Cl. 101—115 **80 Claims**



1. Apparatus for use in combination with a screen printing machine having an endless movable printing blanket and a discharge end, said endless movable printing blanket being capable of having a work piece to be screen printed adhered thereon, said apparatus comprising

transfer means disposed adjacent to the discharge end of a screen printing machine for effecting the movement of said work piece from a printing blanket to said transfer means,

removing means including a series of spaced apart endless belt strips,

said transfer means comprising elevating means for initially lifting the leading edge of said work piece upwardly from said printing blanket so as to suspend the leading edge until the work piece is advanced a predetermined distance for subsequent engagement by said removing means such that the leading edge bridges any spacing between the

discharge end of said screen printing machine and said transfer means,

said removing means being disposed in predetermined operating relationship with respect to said elevating means,

gripping means comprising a plurality of needle like elements formed on the surface of said series of spaced apart endless belt strips for gripping the work piece and peelingly stripping said adhered work piece from said printing blanket to effect the transfer of the work piece from said printing blanket to said series of endless belt strips,

said gripping means first engaging the leading edge suspended by said elevating means, and

first drive means for driving said endless belt strips in timed relationship to said printing blanket such that during the relative movement therebetween said elevating means lifts the leading edge of the work piece and causes said gripping means to peelingly strip the work piece from said printing blanket.

4,176,602

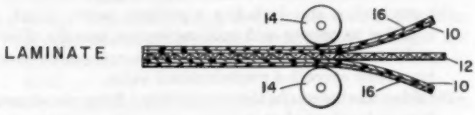
DRY FILM SCREEN STENCIL AND METHOD OF MAKING

Phyllis A. Feddersen, Pomona, Calif., assignor to General Dynamics Corporation, Pomona, Calif.

Continuation-in-part of Ser. No. 609,843, Sep. 2, 1975, abandoned. This application Jun. 10, 1977, Ser. No. 805,493

Int. Cl.[2] B41H *1/24*; B41C *1/14*

U.S. Cl. 430—308 **22 Claims**



1. A method of making a dry film stencil comprising the steps of:

selecting an open mesh support screen

selecting and laminating a facing layer and a backing layer of dry film photoresist together through and from opposite sides of said screen by applying pressure thereto for forming a film laminate,

exposing the film laminate through a transparency for forming an exposed film, and p1 developing the film for thereby forming a screen stencil of the developed film laminate.

4,176,603

LABEL STRIP INSERTING DEVICE

Yo Sato, Tokyo, Japan, assignor to Kabushiki Kaisha Sato Kenkyusho, Tokyo, Japan

Filed Sep. 28, 1977, Ser. No. 837,193

Claims priority, application Japan, Oct. 22, 1976, 51-142079[U]

Int. Cl.[2] B41K *3/44*; B41J *15/04*; B41F *1/08*

U.S. Cl. 101—291 **11 Claims**

1. A label strip insertion device for a label printing machine, wherein said machine comprises:

a frame;

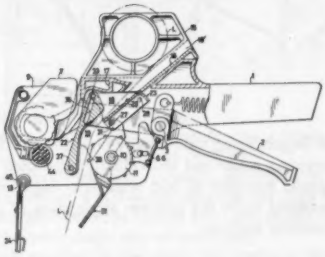
feed means attached to said frame for advancing a label strip along said frame;

an insertion device comprising:

a platen supported on said frame for motion between a lowered first inoperative position relatively further from said feed means and an upraised first operative position relatively nearer to said feed means; said platen having an upwardly facing surface over which a label strip can be fed and said upwardly facing surface being moved nearer to said feed means as said platen is moved to said first operative position;

a label guide member having a lower surface portion generally opposed to said feed means and beneath which the label strip can be fed; said guide member being supported on said frame for motion between an upraised second inoperative position relatively further from said feed means and a lowered second operative position relatively nearer to said feed means; said guide member being so placed that when it is in its second operative position, said lower surface portion thereof urges the label strip against said feed means for engagement thereby; said first and second inoperative positions being such that a widened space between said guide member and said feed means is created upon movement of said guide member and said platen to their respective said second and first inoperative positions;

an operating member supported on said frame for motion between a third position and a fourth position, and connected to both said platen and said guide member, such



that said operating member transmits the motion of said platen to said guide member, whereby said platen and said guide member move simultaneously to their respective said first and second operative position when said operating member is in its said third position and to their respective said first and second inoperative position when said operating member is in its said fourth position;

said operating member having a label strip guide surface which, when said operating member in said fourth position, has a first orientation, which extends along a direction that directs a label strip into said widened space; said operating member label strip guide surface being so shaped and said guide member being so shaped that when said operating member is in said fourth position, a label strip fed past said operating member to said guide member is slightly deflected by said label strip guide surface before it is engaged by said guide member, whereby the label strip may be kept taut.

4,176,604

APPARATUS FOR PRINTING A LABEL ON A WEB

Roger D. Eagen, 5639 Humboldt Ave., and Clarence E. Vogel, 5628 Humboldt Ave., both of Minneapolis, Minn. 55419

Filed Mar. 23, 1978, Ser. No. 889,222

Int. Cl.[2] B41F *31/24*

U.S. Cl. 101—328 **2 Claims**

1. A label printing apparatus for a continuous web having in combination

a web formed of an endless strip of separable containers,

means supporting said web,

a first plate member carried by said means having said web pass thereover,

a second plate member,

means adjustable securing said second plate member to said first plate member in spaced relation thereto,

a printing roller,

means supporting said printing roller onto said second plate member in operating engagement with said web,

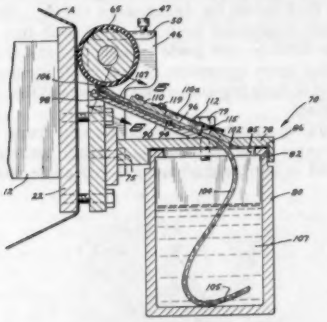
an ink reservoir,

means carried by said second plate member supporting said ink reservoir,

a wick carried by said last mentioned means from said ink well into operating engagement with said printing roller,

a unitary spring plate member underlying said wick,

a multiplicity of spring like fingers unitary with and extending from said plate member underlying said wick edge portion engaging said printing roller, and



said fingers being individually biased in the direction of said printing roller and individually urge their respective engaged portions of said wick into engagement with said printing roller for uniform application of ink onto a non-uniform surface.

4,176,605

LITHOGRAPHIC PRINTING PROCESS

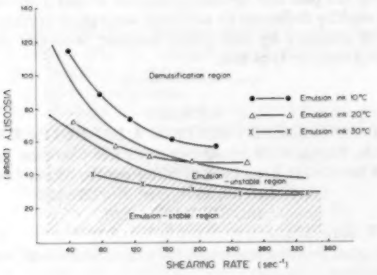
Akihiko Yoshida, Tokyo; Akira Koaki, Mihara; Takahumi Nakano, Hiroshima; Mitsunao Miyake, Mihara; Teijiro Kanai, and Izumi Misono, both of Tokyo, all of Japan, assignors to Toyo Ink Manufacturing Co., Ltd. and Mitsubishi Jukogyo Kabushiki Kaisha, both of Tokyo, Japan

Filed Sep. 7, 1977, Ser. No. 831,312

Claims priority, application Japan, Sep. 13, 1976, 51/108863; Sep. 13, 1976, 51/108864

Int. Cl.[2] B41L *25/14, 25/02*

U.S. Cl. 101—451 **10 Claims**



2. A lithographic printing process comprising the steps of:

supplying a stable emulsion ink in an ink fountain,

supplying in an ink fountain an emulsion ink which is stable at ambient temperature but subject to demulsification upon cooling,

demulsifying said emulsion into an oleophilic component and an aqueous component at said region, said demulsifying being effected by said action of said cooling, and

passing said oleophilic and aqueous components so produced to a printing plate in the inking system to thereby obtain highgrowth prints reliably without the need of dampening water.

4,176,606

PYROTECHNIC DEVICES

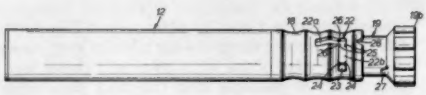
Colin M. King, Winterbourne Stoke; Michael R. Goddard, Gt. Wishford, and Dudley C. Murray, Salisbury, all of England, assignors to Pains-Wessex Limited, England

Filed Dec. 12, 1977, Ser. No. 859,400

Claims priority, application United Kingdom, Jan. 6, 1977, 319/77

Int. Cl.[2] F42B *4/26*

U.S. Cl. 102—37.4 **9 Claims**



1. A hand-operable pyrotechnic device for containing a charge of pyrotechnic material, the device having

a firing mechanism provided with a safety device and operable to detonate a primer thereby to ignite the pyrotechnic material,

the firing mechanism comprising two members which are movable relatively to one another in a rotational sense from a 'Safe' to an 'Armed' position when located in a predetermined relative axial position, and in an axial sense from an 'Armed' to a 'Fire' position when located in a predetermined relative rotational position,

the mechanism also including a resilient detent which is effective to oppose said axial movement into the 'Fire' position until the force applied to cause said relative axial movement exceeds a predetermined value,

the firing mechanism further comprising a firing pin secured to one of said members and being movable, by the relative axial movement of the said two members, to contact a primer when said primer has been located in position in the other said member.

4,176,607

ROCKET SHELL

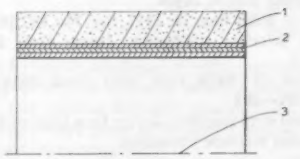
Kazuo Kishi, Himeji; Minoru Hayashi, Tatsuno, and Kazuo Naganuma, Himeji, all of Japan, assignors to Daicel LTD., Osaka, Japan

Filed Aug. 31, 1977, Ser. No. 829,511

Claims priority, application Japan, Sep. 3, 1976, 51/105495

Int. Cl.[2] F02K *9/00*

U.S. Cl. 102—49.3 **5 Claims**



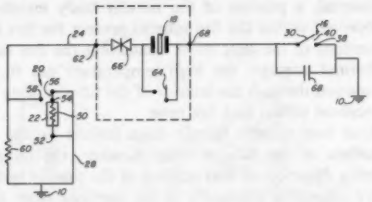
1. A cylindrical rocket shell prepared by rolling up a plurality of turns of a thin sheet of high tensile strength precipitation hardened stainless steel with an organic thermosetting adhesive being disposed between said turns whereby to form an inner cylinder, then winding on the outer surface of said inner cylinder filaments having a high tensile strength and an organic thermosetting adhesive whereby to form an outer cylinder, said filaments being selected from the group consisting of carbon fibers and organic polyamide filaments, and then curing said adhesives to form a unitary cylindrical structure consisting essentially of said inner cylinder united to said outer cylinder.

4,176,608

ELECTRICALLY ENERGIZED IMPACT DETONATED PROJECTILE WITH SAFETY DEVICE

Leonard R. Ambrosini, Bettendorf, Iowa; Joseph O. Juliano, West Orange, N.J., and Charles H. Rarick, Dewitt, Iowa, assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 8, 1978, Ser. No. 904,052
Int. Cl.[2] F42C *15/14*
U.S. Cl. 102—216 5 Claims



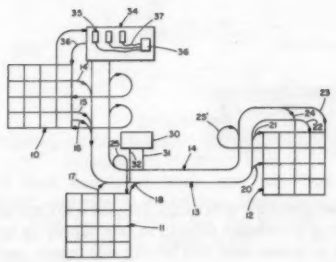
1. A projectile having impact detonation characteristics including:
- a firing circuit for energizing a detonator upon target impact, an inertia switch,
- a base fuze having said detonator with said inertia switch connecting said detonator into said firing circuit,
- a power supply,
- an impact switch, and
- a voltage threshold limiting device connected in circuit to prevent energization of said circuit when voltages are generated in said circuit below a predetermined threshold level,
- said power supply having a setback shorting bar thereacross to prevent circuit energization during setback, said shorting bar thereafter permitting energization upon opening after setback.

4,176,609

ELECTRIC TRANSPORTATION SYSTEM

Dillis V. Allen, 221 Hawthorne Ct., Schaumburg, Ill. 60193

Filed Oct. 28, 1977, Ser. No. 846,534
Int. Cl.[2] B61J *3/00*
U.S. Cl. 104—88 5 Claims



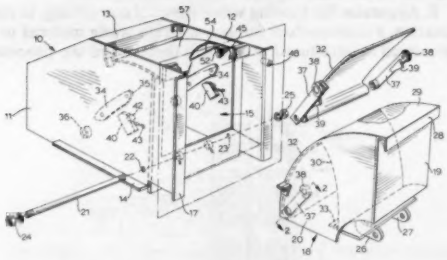
1. A transportation system, comprising; a vehicle trackway having a plurality of entrances and exits, a plurality of vehicles adapted to travel in the trackway or off the trackway, said vehicles having inflatable tire wheel assemblies, each of said vehicles having steering means for at least one of said inflatable tire wheel assemblies, said trackway including a horizontal guide surface and a vertical guide surface, each of said vehicles having guide means engageable with the horizontal guide surface and the vertical guide surface, and means on each of said vehicles for positively moving the guide means vertically into engagement with said horizontal guide surface while the vehicles are moving adjacent the trackway.

4,176,610

SAFE DEPOSIT APPARATUS

Michael H. Markham, Rexdale, and Rudolf S. Ruston, Oakville, both of Canada, assignors to Chubb Industries Limited, Brampton, Canada

Filed Sep. 12, 1978, Ser. No. 941,584
Int. Cl.[2] E05G *1/026*
U.S. Cl. 109—59 R 13 Claims



1. Safe deposit apparatus comprising:
- a casing defining a door compartment having a frontal access opening and a rear discharge opening;
- a sector-shaped door therein horizontally pivoted at its apex axis near the bottom of said access opening, the door being pivotally movable between closed and open positions;
- a handle on the outer angle side of said door;
- a movable wall member horizontally pivoted near the peripheral corner of the other and inner angle side of said door;
- said wall member being normally biassed to a first position at which it forms an interior pocket in the door for receiving articles deposited through said access opening when the door is in open position;
- said wall member being pivotally movable from said first position towards a second position for ejecting articles from said pocket;
- a first cam track mounted on a side wall of the casing and having a forward end rearwardly displaced from said access opening;
- a first cam follower on said door connected to said wall member, said first cam follower being positioned to engage and ride along the cam track when the door is opened for retaining the wall member in its second position, the cam follower disengaging the cam track at said forward end to release the wall member to its first position thereby forming said pocket;
- a second cam track on said door connected to said wall member; and
- a second cam follower on a side wall of the casing positioned to engage the second cam track as the door is closed for displacing the wall member to its second position thereby to eject articles from said pocket via said discharge opening.

4,176,611

METHOD AND APPARATUS FOR TREATING WASTE MATERIAL

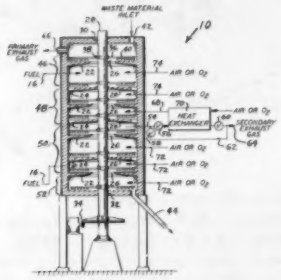
Charles F. von Dreusche, Jr., Ramsey, and Louis T. Barry, Skillman, both of N.J., assignors to Nichols Engineering & Research Corp., Belle Mead, N.J.

Division of Ser. No. 706,615, Jul. 19, 1976, Pat. No. 4,118,220.
This application Jul. 18, 1978, Ser. No. 925,810
Int. Cl.[2] F23G *5/12*
U.S. Cl. 110—225 8 Claims

1. In a counter-flow furnace wherein waste material to be processed is introduced at one end thereof and the processed material is discharged from the other end thereof, while simultaneously air is introduced thereto and the gases of combustion are caused to flow in counter-current direction with respect to

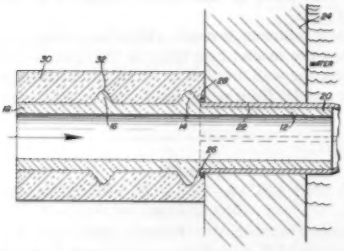
the material being processed and are exhausted at said one end of the furnace and wherein the furnace has a natural tendency to form zones of processing including sequentially from said one end of the furnace, a drying zone, a charring and volatile burning zone, a fixed carbon burning zone and an ash cooling zone, a method comprising the steps of bleeding secondary exhaust gases from the middle of said furnace substantially between said fixed carbon burning zone and said charring and volatile burning zone, and adding supplemental air to said furnace in the charring and volatile burning zone.

5. Apparatus for treating waste material comprising, in combination, a counter-flow furnace wherein waste material to be processed is introduced at one end thereof and the processed



material is discharged from the other end thereof, means for introducing air to said furnace, means for causing the gases of combustion to flow in counter-current direction with respect to the material being processed, a primary exhaust gas outlet disposed at said one end of the furnace, said furnace having a natural tendency to form zones of processing including sequentially from said one end of the furnace, a drying zone, a charring and volatile burning zone, a fixed carbon burning zone and an ash cooling zone, means for bleeding secondary exhaust gases from the middle of said furnace substantially between said fixed carbon burning zone and said charring and volatile burning zone, and means for adding supplemental air to said furnace in the charring and volatile burning zone.

4,176,612
CERAMIC FERRULE
Kenneth Speer, Box 1115, Jal, N. Mex. 88252
Filed Mar. 6, 1978, Ser. No. 884,627
Int. Cl.[2] F23M *9/00*
U.S. Cl. 110—323 **10 Claims**



1. An improved ceramic ferrule structure for the protection of fire tube structures through which high temperature gas flows are directed, comprising:

a tubular body member formed of a thermally resistant material; and

at least two annular ferrule rings formed on the external surface of the tubular body member, the rings being spaced apart, a body of refractory material being disposed over at least those portions of the tubular body member on which the ferrule rings are disposed, one of the ferrule rings being disposed substantially medially of the length of the tubular body member.

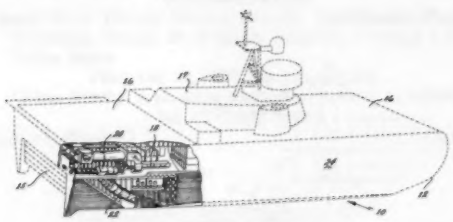
5. In a boiler structure formed of a tube sheet having a fire tube extending therethrough from an outer wall surface thereof to a water bath disposed interiorly of an inner wall surface thereof, a high temperature gas flow being directed through the fire tube, an improved ceramic ferrule member, comprising:

a tubular body member formed of a thermally resistant material, a portion of the tubular body member being received within the fire tube to protect the fire tube and portions of the tube sheet contacting the fire tube from thermal damage, the high temperature gas flow being received through the interior of the tubular body member received within said fire tube;

at least two annular ferrule rings formed on the external surface of the tubular body member, the ferrule rings being disposed on that portion of the tubular body member extending externally of the fire tube from the outer wall surface of the tube sheet, the rings being spaced apart; and,

a body of refractory material disposed over that portion of the tubular body member disposed exteriorly of the outer wall surface of the tube sheet, the annular ferrule rings being disposed within the body of refractory material to anchor the ceramic ferrule member therein.

4,176,613
FIXED GEOMETRY WATER JET INLET FOR A SURFACE EFFECT SHIP
Michael A. Rickards, La Jolla; Richard K. Ruhe, San Diego; Leonard Meyerhoff, Chula Vista, and James M. Hook, Solana Beach, all of Calif., assignors to Rohr Industries, Inc., Chula Vista, Calif.
Filed Nov. 25, 1977, Ser. No. 854,637
Int. Cl.[2] B63H *11/02*
U.S. Cl. 114—67 A **11 Claims**



1. A fixed geometry water inlet duct for a surface effect ship for providing a constant cavitation free supply of water to a propulsion jet pump, said ship having side fences, each of said side fences having a curvilinear bottom hull surface, said inlet duct comprising:

a ramp roof portion extending rearward and forming a continuation of the bottom hull surface and extending rearward to the inlet of said jet pump;

a duct floor portion extending from a position intermediate the forward and aft portions of said ramp roof portion and extending to said inlet of said jet pump, said ramp roof portion and said duct floor portion being continuous for the length of said duct floor portion;

an enlarged lip portion positioned at the leading edge of said duct floor portion; and

a ventilation cavity adjacent said enlarged lip portion.

4,176,614

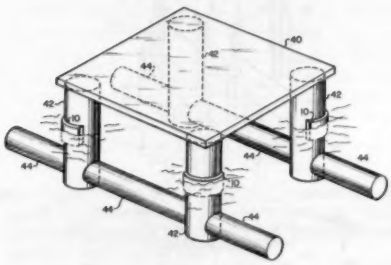
CONTROL FORCE TANK AND METHOD FOR STABILIZING FLOATING VESSELS

Wilbur H. Goss, Santa Barbara, and Gunnar B. Bergman, Montecito, both of Calif., assignors to SeaTek Corporation, Goleta, Calif.

Continuation of Ser. No. 734,111, Oct. 20, 1976, abandoned, which is a continuation-in-part of Ser. No. 731,006, Oct. 8, 1976, abandoned. This application Mar. 30, 1978, Ser. No. 891,543

Int. Cl.[2] B63B *43/06*

U.S. Cl. 114—125 16 Claims



1. A system for stabilizing a vessel having flotation means, said system comprising:

one or more tanks, having open access to the water, mounted to the outboard surfaces of the flotation means at a point where the ambient surface of the water approximately intersects the flotation means;

said tanks being selectively supplied with air in such magnitudes and phases as are required to develop control forces for producing control forces to stabilize the motion of the vessel in varying water conditions;

said control forces being developed solely by the selective supply of air to said tanks.

11. A method of applying control forces for stabilizing a vessel having a flotation member, said method comprising the step of applying selectively variable control forces to the outboard surface of the flotation member at a point where said flotation member approximately intersects the ambient surface of the water independent of the movement of the vessel through the water.

4,176,615

MOORING ATTACHMENT FOR SINGLE POINT MOORING TERMINALS

William R. Reid, Ann Arbor, Mich., and John Vitale, Los Angeles, Calif., assignors to Amtel, Inc., Providence, R.I.

Filed Nov. 21, 1977, Ser. No. 853,291

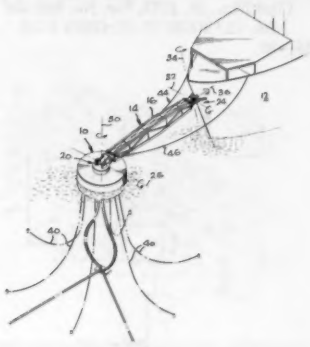
Int. Cl.[2] B63B *21/00*

U.S. Cl. 114—230 6 Claims

1. A mooring attachment for substantially permanently connecting a buoy and a vessel that has an end portion comprising:

a mooring arm that resists compression, having a first end pivotally coupled to said buoy and a second end pivotally coupled to an end portion of said vessel to permit said vessel to pivot about a largely vertical axis with respect to said arm, so that the vessel can yaw; and

a pair of stop means disposed at opposite sides of said largely vertical axis for preventing yawing of said vessel by more than a predetermined angle which is more than 10° on either side of a center orientation of the vessel, said stop means constructed so they do not resist yawing of said vessel within 10° on either side of the center orientation of



the vessel, whereby to avoid loading of the stop means during small vessel yawing.

4,176,616

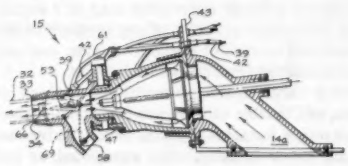
VARIABLE THRUST CONTROLLER FOR WATER JET PROPULSION SYSTEM

Thomas L. Robins, 2770 Melendy Dr., #1, San Carlos, Calif. 94070

Filed Jul. 8, 1977, Ser. No. 813,933

Int. Cl.[2] B63H *11/02*

U.S. Cl. 115—14 5 Claims

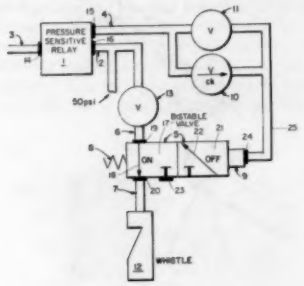


1. In a water jet propulsion system of a type for moving a boat through the water and having an engine and means driven by said engine for discharging a stream of water from the boat to generate thrust serving to move the boat in response thereto, the last named means comprising a discharge nozzle of predetermined diameter serving to discharge the water therethrough to propel said boat at a speed associated with thrust derived from the velocity of said discharging liquid, means for constricting the size of said stream of said discharging water to change the velocity of said stream to vary the thrust applied to the boat, means forming forwardly directed flow passage in fluid communication with said nozzle, first closure means within said nozzle movable between first and second positions for selectively directing the discharging stream rearwardly of said nozzle to provide forward movement to said boat or forwardly via said flow passage to apply a reversing thrust to the boat, a second closure means, said second closure means being disposed in said flow passage, and means coupling said first closure means to said second closure means for disposing said second closure means in fluid blocking relation when disposing the first closure means in fluid transmitting relation rearwardly via said nozzle and vice versa.

4,176,617
LOW PRESSURE ALARM

Mark Pilipski, 89 Mountainside Ter., Clifton, N.J. 07013

Filed Mar. 23, 1978, Ser. No. 889,484
Int. Cl.[2] F16K *37/00*; G08B *3/06*
U.S. Cl. 116—70 5 Claims



1. A device comprising

a first pressure source,

a second pressure source, said second pressure source being a monitored pressure,

a pressure sensitive relay means, said relay means having at least a first port, a second port, and a third port, said first port connected to the first pressure source, and said second port connected to the second pressure source, said pressure sensitive relay means having an output means which emits an output pressure in response to the second pressure source applied to said second port, said output pressure being either a pressure approximately equal to the first pressure source or a zero or negative pressure; if the monitored pressure is positive, then the output pressure of the pressure sensitive relay means is approximately equal to the pressure of the first pressure source, if the monitored pressure approaches zero or a negative value, then the output pressure of the pressure sensitive relay means will be zero or a negative value, said output pressure is emitted from the said third port,

a bistable valve means, normally biased to an unactuated state, said bistable valve means functionally consisting of a pilot means for actuating said bistable valve means and a means for establishing, when unactuated, an internal passage between at least two ports said internal passage of said parts constituting a fourth port and fifth port, said bistable valve means may be actuated by a pressure, approximately equal to the first pressure source, applied to said pilot means, said pilot means is connected to the output means of the pressure sensitive relay means through

a first valving means, said first valving means functions to direct and control the flow of any fluent substance, gas or liquid to and from the said output means of the pressure sensitive relay means and the said pilot means of the bistable valve means,

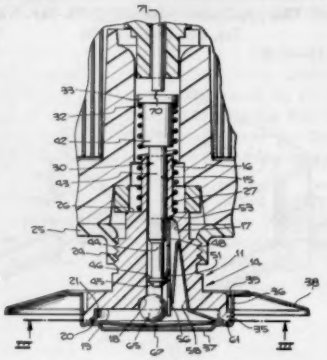
a second valving means, said second valving means connected to the first pressure source, said second valving means also being connected to the said fourth port of the bistable valve means, said second valving means functions to control the flow of any fluent substance, from the first pressure source to the said fourth port of the bistable valve means,

and a signal producing means, said signal producing means connected to said fifth port of the bistable valve means, said signal producing means functions to produce a signal whenever any fluent substance flows to said signal producing means.

4,176,618
TRIGGERING DEVICE FOR COMBUSTION DETECTOR

Gustav Hubert, San Gabriel, Calif., assignor to Notifier Company, Lincoln, Nebr.

Filed Jul. 13, 1978, Ser. No. 924,368
Int. Cl.[2] G08B *17/00*
U.S. Cl. 116—102 11 Claims



1. In an alarm device having alarm signal means; the combination of:

a body member having a through bore and a body chamber at one side of said bore at one end thereof;

a pin member longitudinally slideable in said bore and terminating opposite said chamber;

spring means on said body member adjacent the other end of said bore and engaged by said pin member for biasing said pin member in one direction;

a condition sensing and responsive means adjacent the one end of said bore and spaced from the adjacent end of said pin member;

biased latch means in said body chamber engageable with said pin member adjacent the one end of the bore to retain said pin member in one position against the bias of said spring means;

and means opposite to said body chamber in contact with said latch means adapted to be moved toward said body chamber by said condition sensing means to release said latch means from said pin member for movement of said pin member in said one direction to cause actuation of said alarm signal means.

4,176,619
PAPER SURFACE TREATING DEVICE

Rune A. Wäppling, Sundsvall, Sweden, assignor to Sca Development Aktiebolag, Sundsvall, Sweden

Filed Dec. 16, 1977, Ser. No. 861,344
Claims priority, application Sweden, Dec. 21, 1976, 7614343
Int. Cl.[2] B05C *5/02*
U.S. Cl. 118—410 3 Claims

1. A device for applying a fluid surface treatment agent to a paper web, comprising:

a container for receiving said fluid surface treatment agent to be applied to said paper web;

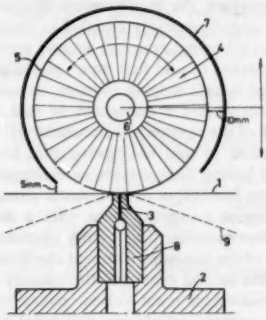
said container including two spaced guide bars forming a fluid applying gap adapted to be disposed in contact with said paper web for applying said fluid surface treatment agent from said container to said paper web;

means for moving said paper web over said guide bars substantially parallel to the upper surfaces of said guide bars;

a rotary brush positioned opposite said container for rotation relative to said paper web;

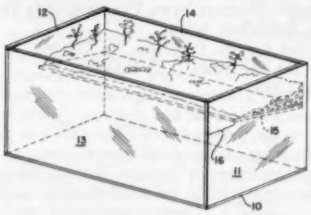
said rotary brush including soft and fluffy peripheral surfaces for applying pressure to said paper web to press said paper web into contact with said fluid applying gap as said

paper web receives said fluid surface treatment agent therefrom, and



means for adjusting the position and pressure of said rotary brush relative to said paper web to vary the thickness of the coating applied to said paper web independent of the speed of said moving paper web.

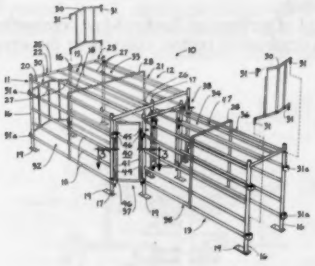
4,176,620
AQUARIUM-TERRARIUM TANK
Thomas G. Kassos, 120 Brookmeade Dr., Pittsburgh, Pa. 15237
Filed Oct. 25, 1977, Ser. No. 844,560
Int. Cl.[2] A01K *64/00*
U.S. Cl. 119—5 **6 Claims**



1. The combination of an aquarium tank having a bottom wall and vertically-extending side walls for containing a body of water, and a terrarium floor adhered along edge surfaces thereof to the vertical face surfaces of said side walls at a location above said bottom wall, said terrarium floor extending in an upwardly-inclined manner relative to said bottom wall to form a terrarium compartment having a triangular cross section formed by said terrarium floor and part of said side walls thereabove, one edge surface of said terrarium floor being spaced from a side wall of said aquarium tank to form an opening therebetween of sufficient size for access to the body of water below the terrarium floor.

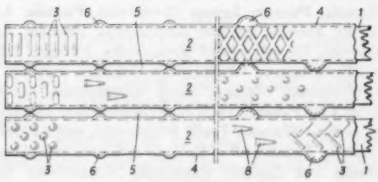
4,176,621
PIG CONFINEMENT STALL ASSEMBLY
Terry A. Dill, Keota, Iowa, assignor to The Jefferson Industries Company, Fairfield, Iowa
Filed Jul. 7, 1978, Ser. No. 922,594
Int. Cl.[2] A01K *1/02*
U.S. Cl. 119—20 **3 Claims**

1. An assembly of pig confinement stalls comprising:
(a) a first upstanding enclosure of a substantially rectangular shape in horizontal cross section and open at one end,
(b) an upstanding partition wall dividing said enclosure into first and second longitudinally extending stalls each of which has an open end,
(c) a substantially v-shaped, upstanding enclosure section for each of said first and second stalls, each v-shaped enclosure section having an apex end and an open base, with the base of each section being connected to the open end of a corresponding stall to form a pair of continuous pig-retaining enclosures; and



(d) a second upstanding enclosure of a substantially rectangular shape in horizontal cross section having one end connected to the apices of said v-shaped upstanding enclosure sections to form a third continuous pig-retaining enclosure.

4,176,622
FLOOR GRID FOR USE IN KEEPING ANIMALS
Johann Wolf, Scharnstein, Austria, assignor to Johann Wolf Gesellschaft m.b.H. KG, Scharnstein, Austria
Filed Jan. 6, 1977, Ser. No. 757,334
Claims priority, application Austria, Jan. 8, 1976, 2807645/76
Int. Cl.[2] A01K *1/015*
U.S. Cl. 119—28 **12 Claims**



1. A floor grid for use in keeping animals, which comprises
a plurality of juxtaposed wooden bars, which are transversely spaced apart to define gaps between them, and
a covering provided on top of each bar and having depending longitudinal edge portions that extend downwardly along opposite sides of each bar and laterally protruding portions integral with said downwardly depending longitudinal edge portions and also extending downwardly along the sides of the bars and spaced apart along the bars to space the bars apart laterally.

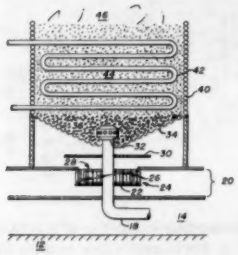
4,176,623
FLUIDIZED BED BOILER
Henry J. Blaskowski, West Simsbury, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.
Filed Mar. 8, 1978, Ser. No. 884,651
Int. Cl.[2] F23D *1/00*; F22B *29/00*
U.S. Cl. 122—367 PF **5 Claims**

1. A fluidized-bed cell, comprising:
a. a combustion region;
b. a static ignition bed, positioned in the combustion region, comprising inert heat-storage particles;
c. a fluidizing region, positioned in the combustion region above and immediately adjacent to the static ignition bed;
d. means for feeding fuel particles into the static ignition bed;
e. means for blowing air up thru the static ignition bed into

the fluidizing region in such a manner as to fluidize the fuel particles but not the inert heat-storage particles, thereby establishing a fluidized bed of coal particles in the fluidizing region; and

f. means for igniting fuel particles supplied to the static ignition bed.

3. A method of performing fluidized-bed combustion of fuel particles in a combustion region, comprising the steps of:



a. providing a static ignition bed of inert heat-storage particles in the combustion region;

b. feeding fuel particles into the static ignition bed of inert heat-storage particles;

c. establishing a fluidized bed of fuel particles in the combustion region above and immediately adjacent to the static ignition bed; and

d. igniting the fuel particles supplied to the static ignition bed.

4,176,624

DIESEL ENGINE WITH ELECTRONIC CONTROL

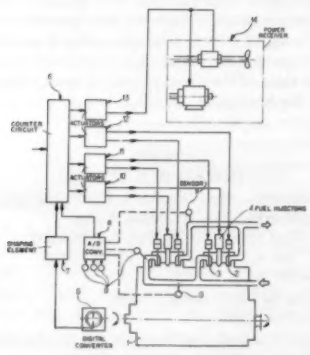
Marek Bielecki, Poznań; Andrzej Bogdański, Warsaw; Andrzej Buxakowski, Poznań; Janusz Chudziński, Poznań; Andrzej Głogowski, Poznań; Marian Kopczyński, Poznań; Andrzej Królikowski, Poznań; Józef Kryszewski, Poznań; Zdzisław Moczulski, Warsaw; Włodzimierz Ochocki, Poznań; Aleksander Pomorski, Warsaw; Karol Rumatowski; Janusz Sawicki, both of Poznań; Henryk Szostakowski; Tadeusz Warowny, both of Warsaw; Teofil Wiśniewski, and Antoni Woźniak, both of Poznan, all of Poland, assignors to Politechnika Poznanska and Zaklady Przemyslu Metalowego, both of Poznań, Poland

Filed Jan. 19, 1977, Ser. No. 760,670

Claims priority, application Poland, Jan. 27, 1976, 186837

Int. Cl.[2] F02B *3/00*

U.S. Cl. 123—32 EA **10 Claims**



1. In a multi-cylinder, two- or four-stroke diesel engine with electronic control, comprising an output shaft, a piston-crank assembly with inlet valves and exhaust valves controlled electropneumatically or electrohydraulically, and injectors supplied with fuel under high pressure provided with control means for regulating fuel supply as a function of at least one operational parameter of the engine, said control means including an electromagnet, the improvement comprising a digital converter **5** of angular velocity coupled to the output shaft, a counter circuit **6** having first and second inputs, a shaping element **7** connected to said first input, said digital converter being connected to said shaping element, an assembly of analog-to-digital converters **8** connected to said second input, sensor means **9** of the operational parameter of the engine and of load connected to said analog-to-digital converters, said counter circuit having four outputs, an electronic actuator **10** connected to the first output of the counter circuit to supply to individual injectors a current pulse with a duration corresponding to the operation time of the electromagnet of the control means of the injectors, a second electronic actuator **11** connected to the second output of the counter circuit which transmits, to individual input valves, pulses controlling the actuators for opening and closing said input valves, a third electronic actuator **12** connected to the third output of the counter circuit **6** which transmits, to individual exhaust valves, pulses controlling the actuators for opening and closing of said exhaust valves, and a fourth electronic actuator connected to the fourth output of the counter circuit **6** which acts upon the power receiver of the engine to vary the load thereof according to an optimum setting of the fuel charge for the given rotational speed of the engine.

4,176,625

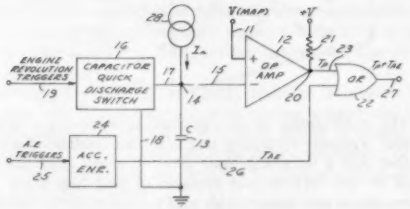
PULSE TIME ADDITION CIRCUIT FOR ELECTRONIC FUEL INJECTION SYSTEMS

Reuben L. Stauffer, Newport News, Va., assignor to The Bendix Corporation, Southfield, Mich.

Filed Apr. 20, 1977, Ser. No. 789,382

Int. Cl.[2] F02B *3/10*; H03K *1/18*

U.S. Cl. 123—32 EH **19 Claims**



1. An electronic fuel injection system for an internal combustion engine having a fuel injection means energized by electrical pulses for periods of time determined by the duration of said pulses; said fuel injection system comprising:

means for generating primary pulses T_p of a duration dependent on the operating parameters of the engine, said T_p pulses generated synchronously with a trigger signal dependent upon the speed of revolution of the engine;

means for generating acceleration enrichment pulses T_{AE} of a duration and frequency dependent upon an acceleration enrichment trigger signal which is responsive to a desired acceleration, wherein said T_{AE} pulses are asynchronous with said T_p pulses; and

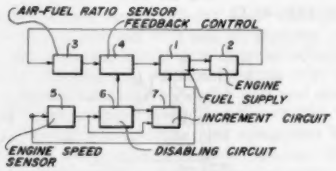
a pulse time addition means for combining said T_p pulses and said T_{AE} pulses in order to generate a total pulse signal to said injection means that has a duration equivalent to the sum of said T_p pulses and said T_{AE} pulses, wherein said pulse time addition means interrupts the generation of said primary pulses T_p for a time duration equivalent to said T_{AE} pulses and then permits the completion of the generation of said primary pulses T_p, said pulse time addition means thereby preventing the loss of fuel to the engine when said T_p and T_{AE} pulses overlap.

4,176,626

AIR-FUEL RATIO FEEDBACK CONTROL SYSTEM

Hideaki Norimatsu, and Yoshiaki Sato, both of Kariya, Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Jul. 5, 1977, Ser. No. 812,560
Claims priority, application Japan, Jul. 3, 1976, 51-79152
Int. Cl.[2] F02B *3/08*; F02M *7/12*; F01N *3/08*
U.S. Cl. 123—32 EE **5 Claims**



1. In combination with a fuel supply system for an internal combustion engine, said fuel supply system controlling the amount of air-fuel mixture to be supplied to an engine in accordance with preset air-fuel ratio characteristics of the fuel supply system, and an air-fuel ratio sensing means for sensing the oxygen concentration of the exhaust gas of an engine and generating an output signal corresponding to the air-fuel ratio of the air-fuel mixture supplied by the fuel supply system, the improvement comprising:

(a) a feedback control circuit connected to the fuel supply system and to the air-fuel ratio sensing means, said feedback control circuit including means for integrating the output signal of the air-fuel ratio sensing means and applying an integrated signal to the fuel supply system;

(b) a disabling circuit connected to the feedback control circuit for disconnecting the feedback control circuit from the fuel supply system when engine speed is above a predetermined value; and

(c) a fuel increment signal generating circuit connected to the fuel supply system and the disabling circuit for generating and applying a compensating signal to the fuel supply system corresponding to engine speed in order to increase the fuel quantity supplied by the fuel supply system when the feedback control circuit is disconnected from the fuel supply system.

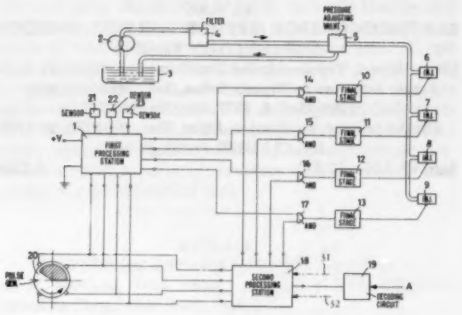
4,176,627

FUEL-INTERMITTENT-INJECTION INSTALLATION FOR INTERNAL-COMBUSTION ENGINES

Aldo Bassi, Milan, Italy, assignor to Alfa Romeo S.p.A., Milan, Italy

Filed Aug. 25, 1977, Ser. No. 827,685
Claims priority, application Italy, Sep. 6, 1976, 26911 A/76
Int. Cl.[2] F02B *3/00*
U.S. Cl. 123—32 EB **3 Claims**

1. An intermittent fuel injection installation for an internal combustion engine having a plurality of cylinders, said installation being characterized in that it comprises an injector for each cylinder of the engine, a fuel-feeding circuit for supplying fuel for said injectors under a preselected pressure, a pulse generator rotatable at a speed proportional to that of the engine and being capable of emitting as many trains of first pulse signals as there are injectors, a processing circuit operatively connected to the pulse generator and being capable of converting said trains of first pulse signals into as many trains of second pulse signals of a preselected magnitude and duration, a control circuit also operatively connected to said pulse generator and further connected to drive means actuable by an operator of the engine and operable to produce drive signals, there being stored in said control circuit preselected and pre-established models of intermittency for the delivery of the fuel by the injectors as a function of the conditions of use of the engine, the control circuit being operable to combine said first pulse signals with said drive signal for generating sequences of control signals for each injector consistent with said models of intermittency stored in said control circuit, the installation further comprising logic circuits in a number equal to the number of the injector and operatively connected to actuation means for the same injectors and also to said processing circuit and said control circuit, each logic circuit effecting a comparison between the pulse signal associated with the injector of a cylinder coming from the processing circuit and the control



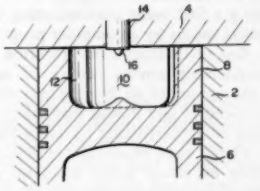
signal coming from the control circuit associated with the injector of the same cylinder for selectively generating a consent or inhibition signal for the means of actuation of the injector which feeds the same cylinder, the action of the several logic circuits being commanded by the control circuit and the processing circuit according to a sequence which has been previously established on the basis of the ignition sequence of the cylinders.

4,176,628

COMBUSTION CHAMBER FOR AN INTERNAL COMBUSTION ENGINE OF DIRECT INJECTION TYPE

Seikichi Kanai, and Kunihiko Komiyama, both of Oyama, Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Nov. 14, 1977, Ser. No. 851,174
Claims priority, application Japan, Nov. 12, 1976, 51/135424
Int. Cl.[2] F02B *23/06*
U.S. Cl. 123—32 A **3 Claims**



1. In an internal combustion engine of the direct injection type including combusion chambers each defined by a cylinder head, a cylinder liner, and a piston head having a wall defining a cavity therein, means for producing an air swirl in said cavity, and fuel injection means each having a plurality of fuel injection nozzles, said fuel injection means being mounted substantially at the central part of said cavity, said nozzles being arranged to inject jets of fuel into said cavity radially against said cavity wall, the improvement wherein said cavity wall is constructed to define a generally toroidal cavity formed in said piston head and a plurality of corner cavities formed continuously to said toroidal cavity, each of said corner cavities being opposed to each of said fuel injection nozzles and

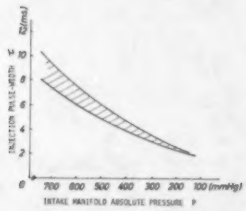
being adapted to receive jets of fuel injected from said fuel injection nozzles, each of said corner cavities being defined by a generally linear wall tangent to one inner peripheral wall of said toroidal cavity and a contiguous generally semi-circular wall interconnecting said linear wall with another inner peripheral wall of said toroidal cavity said another inner wall being adjacent to said one inner wall and, said linear wall being formed on the upstream side of said air swirl.

4,176,629

ELECTRIC CONTROL METHOD FOR FUEL INJECTION AND IGNITION TIMING

Hisasi Kawai, Toyohashi, and Toshikazu Ina, Okazaki, both of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Dec. 1, 1977, Ser. No. 856,509
Claims priority, application Japan, Dec. 10, 1976, 51-149030
Int. Cl.[2] F02B *41/00, 13/00*
U.S. Cl. 123—32 EC **2 Claims**



1. A method for controlling a combustion engine having an output shaft driven by mechanical energy converted from heat energy caused by the combustion of air-fuel mixture, said engine being provided thereon with first control means for controlling the amount of fuel metered into said engine and second control means for controlling the timing of sparks supplied to said engine, the method comprising the steps of:

a. generating a binary number electric signal indicative of the amount of air flowing into said engine;

b. generating a binary number electric signal indicative of rotation speed of said output shaft during operation of said engine;

c. detecting a predetermined angular position of said output shaft before the arrival of a piston to its top dead center to generate a reference signal per one rotation of said output shaft;

d. generating a timing signal with a predetermined phase lag in relation to the reference signal;

e. calculating a first value corresponding to setting of said first control means by a computer programmed to calculate the first value from a first function describing a desired relationship among setting of said first control means, the amount of air flowing into said engine and the rotation speed of said output shaft, the calculation of the first value being performed by using the binary number electric signals upon receiving the timing signal;

f. calculating an actual intake manifold pressure by said computer programmed to calculate the actual intake manifold pressure from a second function describing a relationship between an intake manifold absolute pressure and the calculated first value;

g. calculating a second value corresponding to setting of said second control means by said computer programmed to calculate the second value from a third function describing a desired relationship between setting of said second control means and the calculated intake manifold pressure, the calculation of the second value being performed by using the binary number electric signals upon receiving the reference signal;

h. converting the first and second calculated values into the settings of said first and second control means respectively in response to the timing signal and the reference signal; and

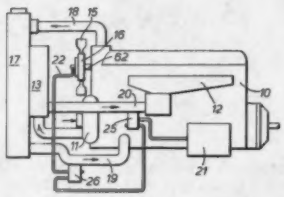
i. continuously repeating the above sequence of steps for controlling the amount of fuel and the timing of sparks in response to changes of the binary number electric signals.

4,176,630

AUTOMATIC CONTROL VALVES

Arthur E. H. Elmer, Stroud, England, assignor to Dynair Limited, Gloucestershire, England

Filed Jun. 1, 1977, Ser. No. 802,496
Int. Cl.[2] F01P *7/12*
U.S. Cl. 123—41.12 **6 Claims**



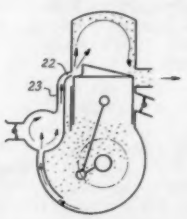
1. Apparatus for controlling the flow of a pressure fluid to a fluid actuator operatively connected to a variable speed drive in the rotary transmission to a cooling fan for a vehicle motor, including two automatic temperature sensing fluid control valves connected in series between a source of pressure fluid and the said fluid actuator, each valve having two operative positions in one of which the valve connects an inlet port to an outlet port, while in the other position it closes the connection between the inlet and outlet ports and connects the outlet port to a relief passage, the arrangement being such that when either valve is in its second position the pressure line leading to the actuator is disconnected from the pressure supply and connected to relief, and in which each of the two valves is directly exposed to a fluid flow associated with said vehicle motor so as to sense the fluid temperature directly.

4,176,631

INTERNAL COMBUSTION ENGINE

Mitsuhiro Kanao, No. 2156-14, Yakeyamacho, Kure-shi, Hiroshima-ken, Japan

Division of Ser. No. 689,892, May 25, 1976, Pat. No. 4,106,439. This application May 24, 1977, Ser. No. 800,104
Claims priority, application Japan, May 27, 1975, 50-63636; Aug. 31, 1975, 50-105755
Int. Cl.[2] F02B *33/04*
U.S. Cl. 123—73 PP **1 Claim**



1. A two-stroke internal combustion engine comprising:

(i) a cylinder

(ii) a piston movable in said cylinder and defining a combustion chamber therein

(iii) a crank-case having an arcuate face

(iv) an air chamber disposed laterally at the upper part of said crank-case

(v) an air inlet on said air chamber, said air inlet having thereon a non-return air inlet valve for said air chamber

(vi) a guide plate spaced from and extending along said

arcuate face of said crank-case so as to define therewith an air flow passageway opening at one end into said air chamber and continually open at the other end into the lower portion of said crank-case

(vii) means in said crank-case and cylinder defining a combustible mixture ejecting port communicating at one end with said crank-case and at the other end with said combustion chamber, said port being opened at said other end when the piston is at and approaching bottom dead centre position

(viii) a passage-forming means defining an air ejecting port communicating at one end with said air chamber and at the other end with said combustion chamber adjacent to said mixture ejecting port said air ejecting port being positioned above said mixture ejection port and directed in relation to said mixture ejecting port such that, upon opening of said mixture ejecting port subsequent to the opening of said air ejecting port during passage of said piston during a downstroke, air forced by said piston from said crank-case through said air passageway into said air chamber and thence through said air ejecting port into said combustion chamber is impinged on by fuel mixture ejected by said piston from said crank-case through said mixture ejecting port and is thereby constrained to flow along the wall of the cylinder and form over the whole of said wall a lamina within which said ejected fuel mixture is contained.

4,176,632

INTERNAL COMBUSTION ENGINE

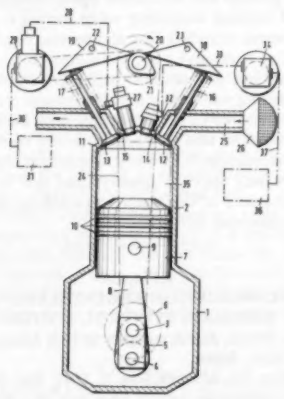
Walter Franke, Hittfelder Kirchweg 22, 2105 Seevetal 3, Fed. Rep. of Germany

Filed Jul. 11, 1977, Ser. No. 814,848

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1976, 2631407

Int. Cl.[2] F02B *47/02;* **F02D** *19/02*

U.S. Cl. 123—75 B **12 Claims**



1. An internal combustion engine including cylinder means, piston means operably engaged within said cylinder means, said cylinder means having wall means defining a cylinder working space within which said piston means are reciprocally movable, fuel injection means for delivering fuel mixture to said cylinder means, exhaust means for exhausting spent fuel from said cylinder means, and inlet means for introducing into said cylinder working space an additional fluid medium consisting of at least one of the media air and liquid, said inlet means comprising: a bore extending through said cylinder wall means in at least one location of said cylinder working space and adapted to permit passage therethrough of said additional fluid medium directly into said cylinder working space under a suction effect generated by said piston means moving toward a bottom dead center position of its working stroke; a feed duct connected to a source of said additional fluid medium; a valve chamber disposed immediately adjacent said feed duct and in direct flow communication therewith, said valve chamber having a diameter which is greater than the diameter of said feed duct; a conical wall portion extending from said valve chamber on the side thereof toward said cylinder working space and extending in a tapering configuration narrowing toward said cylinder working space to a diameter smaller than said diameter of said valve chamber; and a valve disk arranged within said valve chamber to be freely movable therein, said valve disk having a diameter which is larger than both said diameter of said feed duct and said small diameter of said conical wall portion to define the limits of free movement of said valve disk within said valve chamber; said valve chamber being formed with a cylindrical wall defining the radially outer limits of said chamber and said valve disk being formed with a generally square configuration having rounded corner portions defined with a radius of curvature which is smaller than the radius of said cylindrical wall.

4,176,633

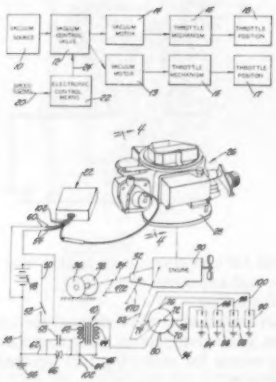
GOVERNOR APPARATUS AND SYSTEM

Ralph P. McCabe, Troy, Mich., assignor to Colt Industries Operation Corp., New York, N.Y.

Filed Feb. 14, 1978, Ser. No. 877,815

Int. Cl.[2] B60K *31/00;* **F02D** *11/08*

U.S. Cl. 123—102 **15 Claims**



1. A governor system for a combustion engine having motive fluid induction passage means, comprising variably positionable first and second throttle valve means for controlling the rate of flow of said motive fluid through said induction passage means and into said engine, first means for sensing the speed of monitored moving means associated with said engine and creating a speed signal in response thereto, electrical control means adapted to receive said speed signal and produce in response thereto an electrical output, first pressure responsive motor means comprising pressure responsive first movable wall means operatively connected to said first throttle valve means, means for providing a fluid pressure to at least one side of said first movable wall means, second pressure responsive motor means comprising pressure responsive second movable wall means operatively connected to said second throttle valve means, said means for providing fluid pressure to at least one side of said first movable wall means also providing a fluid pressure to at least one side of said second movable wall means, and solenoid valve means effective for modulating said fluid pressures as to thereby create pressure differentials across each of said first and second movable wall means, said solenoid

valve means being adapted to receive said electrical output and to modulate said fluid pressures in accordance therewith as to thereby vary the magnitude of said pressure differentials in response thereto, said solenoid valve means being effective to increase the magnitude of said pressure differential across said first movable wall means and thereby cause said first movable wall means to move said first throttle valve means toward a more nearly closed position as the speed of said monitored moving means increases and approaches a preselected governed maximum speed while also being effective to decrease the magnitude of said pressure differential across said second movable wall means and thereby be effective for causing said second movable wall means to move said second throttle valve means toward a more clearly closed position as the speed of said monitored moving means increases and approaches said preselected governed maximum speed.

4,176,634

FUEL INJECTION SYSTEM

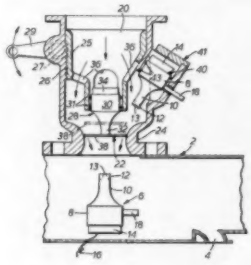
Barrie J. Martin, Shenfield, England, assignor to Plessey Handel und Investments AG, Zug, Switzerland

Filed Jul. 13, 1977, Ser. No. 815,309

Claims priority, application United Kingdom, Jul. 14, 1976, 29202/76

Int. Cl.[2] F02M *27/08, 7/00*

U.S. Cl. 123—119 EE **7 Claims**



1. Apparatus for injecting atomized fuel into an air stream for an engine, said apparatus comprising:

first vibrating means;

valve means including a valve element for controlling said air stream, said valve element being responsive to said first vibrating means for atomizing fuel injected toward said valve element;

second vibrating means; and

fuel injection means, responsive to said second vibrating means, for atomizing and injecting fuel into said air stream and toward said valve element, wherein said valve element further atomizes any of the fuel not previously atomized by said fuel injection means.

4,176,635

EXHAUST GAS RECIRCULATION SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Norihiko Nakamura, Mishima; Noboru Toyama, and Toyokazu Baika, both of Susono, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

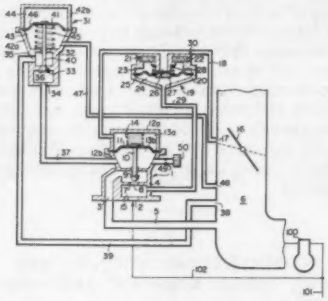
Filed Apr. 19, 1978, Ser. No. 897,870

Claims priority, application Japan, Dec. 29, 1977, 52-159303

Int. Cl.[2] F02M *25/06*

U.S. Cl. 123—119 A **2 Claims**

1. An exhaust gas recirculation system for an internal combustion engine having an intake passage incorporating a throttle valve therein and an exhaust passage, comprising a recirculation passage for recirculating exhaust gases from said exhaust passage to said intake passage, an exhaust gas recirculation control valve provided at a middle portion of said recirculation passage, said control valve having first and second diaphragm chambers and a throttled opening which opens said second diaphragm chamber to the atmosphere and being adapted to increase its opening in accordance with increase of vacuum supplied to said first diaphragm chamber and to decrease its opening in accordance with increase of vacuum supplied to said second diaphragm chamber, a vacuum port provided in said intake passage so as to be located upstream of said throttle valve when it is fully closed and so as to be located downstream of said throttle valve when it is opened beyond a predetermined opening, a first vacuum passage which connects said vacuum port and said first diaphragm chamber of said exhaust gas recirculation control valve, a vacuum control valve provided at a middle portion of said vacuum passage and adapted to control the vacuum conducted through said vacuum passage in accordance with the pressure of exhaust gases in said



recirculation passage, a second vacuum passage which connects said second diaphragm chamber of said exhaust gas recirculation control valve and said intake passage, and a vacuum switching valve which normally intercepts said second vacuum passage and selectively opens said second vacuum passage, said vacuum switching valve having a valve port, a diaphragm means including first and second diaphragm chambers controlling said valve port, and a throttling passage which connects said first and second diaphragm chambers of said vacuum switching valve, said first diaphragm chamber of said vacuum switching valve being supplied with intake vacuum of the engine, wherein said diaphragm means opens said valve port when the vacuum in said first diaphragm chamber of said vacuum switching valve is greater than that in said second diaphragm chamber of said vacuum switching valve by more than a predetermined difference.

4,176,636

INTERNAL COMBUSTION ENGINE HAVING EXHAUST EMISSION CONTROL SYSTEM

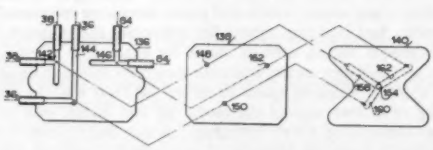
Haruo Mori, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 639,159, Dec. 9, 1975, Pat. No. 4,099,497. This application Apr. 7, 1978, Ser. No. 894,370

Claims priority, application Japan, Dec. 26, 1974, 49/502336

Int. Cl.[2] F02B *33/00;* **F02P** *5/04;* **F16K** *47/04*

U.S. Cl. 123—119 A **2 Claims**



1. Air bleeding apparatus for vacuum actuators in an exhaust emission control system for internal combustion engines comprising

a first plate having a flat face formed with a plurality of first grooves, each of said first grooves communicating with a vacuum source at one end and communicating with a vacuum actuator at the other end,

a second plate adjacent to said first plate covering said first grooves to form conduits therewith,

said second plate being formed with orifices communicating with said first grooves, respectively,

a third plate adjacent to said second plate,

said third plate having a vent hole formed therethrough and having a flat face formed with second grooves communicating with said orifices and said vent hole,

said second gooves diverging from said vent hole, said second grooves being covered by said second plate to form channels therewith, said second plate is joined abuttingly to and between said first plate and said third plate, whereby various vacuum pressures applied from the vacuum sources to a plurality of vacuum actuators may be regulated by a single air bleeding apparatus.

4,176,637

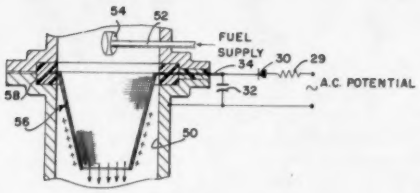
APPARATUS FOR ELECTROSTATIC FUEL MIXING

James D. Cole, Dundee, Ill., assignor to F. D. Farnam Co., Lyons, Ill.

Continuation-in-part of Ser. No. 549,947, Feb. 14, 1975, Pat. No. 4,023,544. This application Apr. 4, 1977, Ser. No. 784,550

Int. Cl.[2] F02M *29/00*; F02C *7/22*

U.S. Cl. 123—119 E **12 Claims**



1. Apparatus for preparing fuel for subsequent combustion comprising:

passage means for discharging a flow of fuel through a mixing zone into a combustion zone, said passage means having an unobstructed passageway therethrough,

electrode means for forming an electrostatic field to induce positive electrostatic charges in said fuel,

means for heating a surface in said mixing zone, and

means for applying a negative charge to a heated surface in the mixing zone, whereby the fuel strikes the surface and provides maximized ratio of fuel surface to fuel volume, the potential difference between the positive and negative charges being about two hundred volts or more.

4,176,638

EGR CONTROL SYSTEM FOR ENGINE EQUIPPED WITH FUEL INJECTION SYSTEM

Hidetoshi Kitamura, and Jun Sato, both of Tokyo, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Apr. 18, 1978, Ser. No. 897,516

Claims priority, application Japan, Jun. 27, 1977, 52/84992[U]

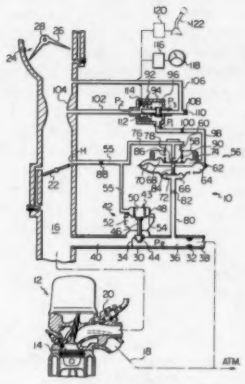
Int. Cl.[2] F02M *25/06*

U.S. Cl. 123—119 A **9 Claims**

1. An exhaust gas recirculation (EGR) control system in combination with motor-vehicle internal combustion engine equipped with an electronically controlled fuel injection system, including a combustion chamber, an intake passageway providing communication between the atmosphere and the combustion chamber, a venturi formed in the intake passageway, a throttle valve rotatably disposed in the intake passageway downstream of the venturi, an airflow meter disposed in the intake passageway upstream of the venturi for providing an information of airflow to the fuel injection system, and an exhaust gas passageway providing communication between the combustion chamber and the atmosphere, said EGR control system comprising:

EGR passageway means providing communication between the exhaust gas passageway and the intake passageway to recirculate exhaust gas back to the combustion chamber;

a diaphragm actuated EGR control valve operatively disposed in said EGR passageway means to divide said EGR passageway means into an upstream portion connecting to the exhaust gas passageway and a downstream portion connecting to the intake passageway, the diaphragm of said EGR control valve defining a first chamber which communicates through first passage means with the intake passageway to provide the first chamber with intake vacuum in the intake passageway, said EGR control valve being operative in accordance with the intake vacuum, to control the pressure of the exhaust gas in the upstream portion of said EGR passageway means so as to control the flow of the recirculated exhaust gas;



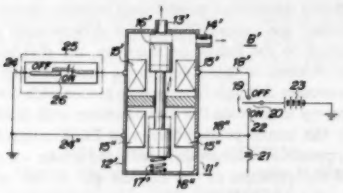
regulating means for regulating the intake vacuum to be provided to the first chamber of said EGR control valve in accordance with the exhaust gas pressure in the upstream portion and in accordance with the vacuum in the venturi, said regulating means including second passage means connecting to said first passage means and having an inlet port communicating with the atmosphere, a pressure regulating valve movable relative to said inlet port of said second passage means for controlling the flow of atmospheric air bled through said inlet port into said second passage means, first and second flexible diaphragms defining a second chamber and a third chamber communicating with the upstream portion of said EGR passageway means, said first and second flexible diaphragms operatively connect to each other and being operatively connected to said pressure regulating valve so as to operate said pressure regulating valve in response to the pressures in said second

selective means for selectively provide the second chamber of said regulating means with the venturi vacuum generated in the venturi and with at least a vacuum generated in the intake passageway between the airflow meter and the venturi, in accordance with driving conditions of the motor-vehicle.

4,176,639
EVAPORATIVE EMISSION SYSTEM FOR IMPROVING ENGINE STARTING CHARACTERISTICS

Osamu Shinoda, Toyota; Keiichi Okabayashi, Aichi, and Takanori Nagai, Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushikikaisha, Aichi, Japan

Filed Aug. 12, 1977, Ser. No. 826,133
Claims priority, application Japan, Jun. 5, 1977, 52-056784[U]
Int. Cl.[2] F02M *33/02*
U.S. Cl. 123—136 **6 Claims**



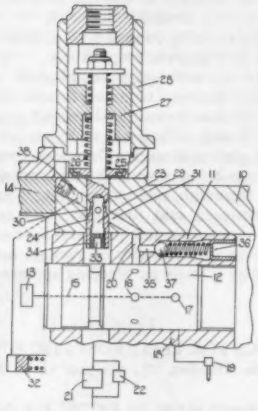
1. An evaporative emission system comprising a carburetor, a canister, an ignition key-operated circuit which includes an ON circuit and an OFF circuit, an inlet port connected to said carburetor, outlet port connected to said canister; a valve means communicating said inlet port with said outlet port for opening and closing said inlet port comprising electromagnetic operating mechanism including two separately energized coils one being disposed in said OFF circuit of said ignition key-operated circuit and the other being disposed in said ON circuit of said ignition key-operated circuit, a single valve as closing and opening means against said inlet port coupled to said coils, means forming part of the system which exhibits an operating temperature thereof, and a temperature-sensing switch means in said OFF circuit of said ignition key-operated circuit and responsive to the operating temperature of said means forming part of the system for interrupting current to said electromagnetic mechanism when the operating temperature falls below a given value.

4,176,640
FUEL INJECTION PUMPING APPARATUS

Robert T. J. Skinner, High Wycombe, England, assignor to Lucas Industries, Limited, Birmingham, England

Filed Apr. 14, 1977, Ser. No. 787,521
Claims priority, application United Kingdom, Apr. 20, 1976, 15899/76
Int. Cl.[2] F02M *59/34, 41/06*
U.S. Cl. 123—139 AQ **4 Claims**

1. A fuel injection pumping apparatus comprising an injection pump operable to deliver fuel during a delivery stroke, a feed pump for supplying fuel to the injection pump during a filling stroke, a housing, a valve within said housing for controlling the output fluid pressure of the feed pump so that the pressure varies in accordance with the speed at which the apparatus is driven, means connecting said feed pump with said injection pump, a throttle within said connecting means for varying the quantity of fuel supplied by the feed pump to the injection pump, said throttle comprising an axially movable member located within a cylindrical portion formed by said housing, said axially moveable member being subjected at one end to said fluid pressure and being movable by an increase in said pressure, resilient means applied to said member in a direction to reduce the amount of fuel supplied by the feed pump to the injection pump said axially moveable member being further provided with a central passage and a groove formed on the outer periphery thereof in communication with said central passage, said passage extending from said one end of said member, an insert secured within said central passage and forming an oriface at the end of said member which is subjected to said fluid pressure, the cylindrical portion formed by said housing and retaining said member including a port in the wall thereof formed by said housing and connecting with said injection pump, the groove and port having variable communication, the extent of which determines the volume of fuel

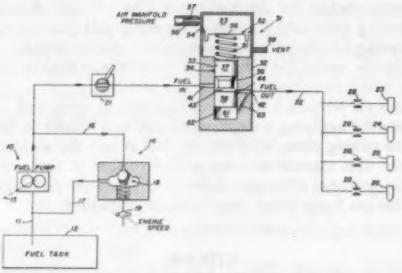


supplied to the injection pump, and fluid pressure responsive means for adjusting the timing of delivery of fuel by said feed pump.

4,176,641
ANEROID FOR A TURBOCHARGED ENGINE

Julius P. Perr, Columbus, Ind., assignor to Cummins Engine Company, Inc., Columbus, Ind.

Filed Dec. 30, 1976, Ser. No. 755,784
Int. Cl.[2] F02D *1/06, 23/02;* F02B *33/00*
U.S. Cl. 123—140 FG **20 Claims**

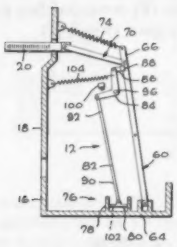


1. An aneroid for use in a fuel supply system for an internal combustion engine including a turbocharger, wherein the quantity of fuel injected in each cycle of the engine is controlled by adjusting the pressure of the fuel in a fuel supply rail, comprising valve means adapted to be connected in said rail and operable to adjust the rail pressure, first means adapted to respond to the pressure boost of the turbocharger and operatively coupled to said valve means for adjusting the rail pressure, and second means adapted to respond to the rail pressure downstream of the aneroid and connected to said valve means for adjusting the rail pressure, said first means being operable to increase the rail pressure with an increase in turbocharger boost and said second means being operable to reduce the rail pressure with an increase in the rail pressure downstream of the aneroid.

4,176,642
DIESEL ENGINE STARTING CONTROL

John H. Shipinski, South Beloit, Ill., assignor to Deere & Company, Moline, Ill.

Filed Dec. 20, 1977, Ser. No. 862,509
Int. Cl.[2] F02M 59/42; F02D 1/04
U.S. Cl. 123—140 R 11 Claims

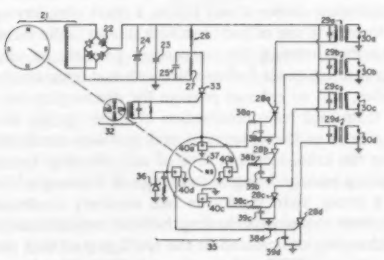


1. In an arrangement in which a governor-operated control rack controls fuel injection in a diesel engine, the control rack being moved into a starting position when the diesl engine is to be started and being moved out of the starting position by the governor upon starting of the diesel engine, the improvement comprising means for retarding movement of the control rack out of the starting position comprising damper means and means coupling the damper means to the control rack to retard movement of the control rack out of the starting position by the damper means, the means coupling the damper means to the control rack including means for permitting at least some movement of the control rack relative to the damper means when the retarding force exerted on the control rack by the damper means and the means coupling exceeds a predetermined value, the damper means retarding movement of the control rack out of the starting position with a force of selected value and resisting movement of the control rack into the starting position with a force substantially less than said force of selected value, the damper means comprising a dashpot having a plunger with a one-way check valve therein.

4,176,643
PULSE GENERATING AND DISTRIBUTING CIRCUITS FOR INTERNAL COMBUSTION ENGINES OR THE LIKE

Bruce R. Beeghly, Youngstown, Ohio, assignor to The Economy Engine Company, Youngstown, Ohio

Filed Jul. 21, 1977, Ser. No. 817,815
Int. Cl.[2] F02P 1/00, 3/06
U.S. Cl. 123—146.5 A 5 Claims



1. A self-powered breakerless pulse generating and distributing system for an internal combustion engine comprising,

a storage capacitor,

means for generating a current for charging said capacitor,

a plurality of electronic power switches in parallel circuits associated with each cylinder of the engine for discharging the storage capacitor,

a pulse generator comprising a rotating member turning in synchronism with said engine arranged to generate timing pulses at given angular positions,

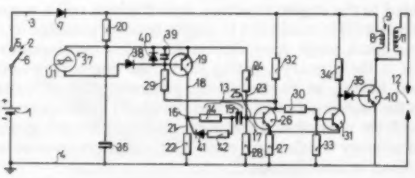
a distributor comprising a rotary member turning in synchronism with said engine and a plurality of Hall effect switches having input, output and power supply terminals, each Hall effect switch arranged to pass a timing pulse to one of said electronic switches when the rotary member is indexed therewith, each Hall effect switch power supply terminal having a current drain associated therewith, each Hall effect switch input and power supply terminal being connected to the output of the pulse generator,

such that each Hall effect switch is arranged to pass the timing pulse to the control terminal of a corresponding power switch when the rotary member is indexed with said Hall effect switch and such that Hall effect switches only drain current during the timing pulse.

4,176,644
ENGINE IGNITION SYSTEM WITH VARIABLE SPARK INTERNAL DURATION

Rainer Hellberg, Straberg-Dormagen; Leo Steinke, Hegnach, and Adolf Fritz, Stuttgart, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Oct. 26, 1977, Ser. No. 845,610
Claims priority, application Fed. Rep. of Germany, Oct. 27, 1976, 2648531
Int. Cl.[2] F02P 3/04, 5/00
U.S. Cl. 123—148 E 16 Claims



1. An engine ignition system including a final stage transistor having its emitter-collector path (10) connected, during engine operation, in series with a dc source and the primary winding of an ignition spark coil and arranged to be recurrently made nonconducting for periods long enough to produce, at a spark plug in the secondary circuit of said spark coil, a main spark discharge and an immediately following discharge tail, and including also an RC circuit branch (13) by which the duration of the period of nonconduction of said path of said transistor is determined, said system incorporating also the improvement consisting in that:

a bridging diode (41) is provided in a shunt around said resistor (14) of said RC circuit branch (13), said bridging diode being so poled that it is conducting during the discharge of said storage capacitor (15), and

said RC circuit branch (13) consists of the series combination of a charging resistor (14), and a storage capacitor (15) so connected that the said nonconducting period of said path of said transistor ends with the charging of said storage capacitor (15) and begins with the discharging of said storage capacitor (15);

the flow of current in at least one direction between the remainder of the system and said RC circuit branch, and thereby the rate of charging and/or discharging of said capacitor (15), is variable automatically in response to at least one operating parameter of the engine in such a manner that under certain operating conditions of the engine the duration of said period of nonconduction is

terminated before the discharge tail (S) following a main spark discharge (A) has subsided.

4,176,645

MOTOR IGNITION SYSTEM CONTROL CIRCUIT FOR MAINTAINING ENERGY STORAGE IN SPARK COIL CONSTANT IN WIDE SPEED RANGE

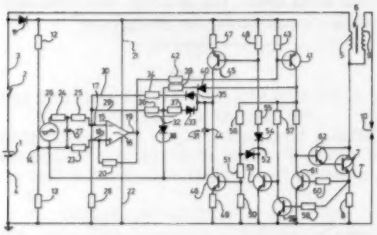
Werner Jundt, Ludwigsburg; Gerhard Sohner, Remshalden; Peter Werner, Stuttgart, and Herman Roozenbeek, Schwieberdingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Oct. 22, 1976, Ser. No. 734,745

Claims priority, application Fed. Rep. of Germany, Nov. 5, 1975, 2549586

Int. Cl.[2] F02P *1/00*

U.S. Cl. 123—148 E **28 Claims**



1. In an ignition system for an internal combustion engine, having a spark coil (6) of which a primary winding (5) is connected in series with an electronic interruptor switch (7) and with a source (1) of direct current of which one terminal is grounded to the engine structure, and of which coil a secondary winding (9) is connected to supply ignition potential to one or more spark plugs upon successive sudden interruptions of current in the primary winding (5) by the interruptor switch (7), and having an engine-driven generator (26) of voltage waves for enabling said electronic switch (7) to be operated in step with the operation of the engine, a circuit for energization of said primary winding and control of said interruptor switch, comprising in combination:

a voltage-sensitive electronic switch (15) for providing voltage steps for respectively switching on and off said electronic interruptor switch (7), said voltage-sensitive switch (15) having its input circuit connected to said wave voltage generator (26) and to said direct current source (1) in such a way as to permit its switching threshold voltages to be varied from their respective quiescent-state values; and

means for producing a regulating voltage including an integrator connected so that its direction of output voltage change is determined by the amount of current through said interruptor switch (7) and so as to change its output voltage progressively in one direction from the moment of a switch-on operation of said voltage-sensitive switch (15) until the current through said interruptor switch (7) reaches a predetermined value and thereafter to change its output voltage progressively in the other direction until the moment of a switch-off operation of said voltage-sensitive switch (15),

said predetermined value of current through said interruptor switch (7) being less than that value of current in said primary winding (5) of said spark coil (6) which constitutes a sufficient storage of ignition energy in said spark coil (6) for generation of a fully effective ignition spark;

the output voltage of said integrator being applied to said voltage-sensitive switch to vary the switch-on threshold of said voltage-sensitive switch and said regulating voltage-producing means being also connected in circuit with said voltage-sensitive switch (15) so as to prevent the latter's switch-off threshold from being deviated by the operation of said integrator,

whereby while the duration of current flow through said interruptor switch (7) tends to be excessive, the switch-on voltage threshold of said voltage-sensitive switch is shifted within the peak-to-peak output voltage range of said generator (26) in the direction (A) producing an earlier start of current through said interruptor switch (7) and while the duration of current flow through said interruptor switch (7) tends to be insufficient, the switch-on threshold of said voltage-sensitive switch (15) is shifted in the opposite direction (B) corresponding to a later start of current in said interruptor switch (7).

4,176,646

METHOD OF IGNITING IN AN INTERNAL COMBUSTION ENGINE

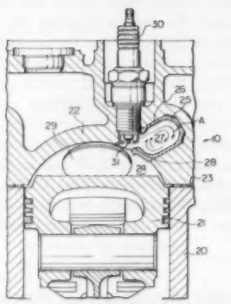
Norihiko Nakamura, Mishima; Takashi Kato, and Tatsuo Kobayashi, both of Susono, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed May 31, 1977, Ser. No. 801,800

Claims priority, application Japan, Mar. 28, 1977, 52-33308

Int. Cl.[2] F02P *5/04;* F02B *19/12;* F02M *25/06*

U.S. Cl. 123—148 E **6 Claims**

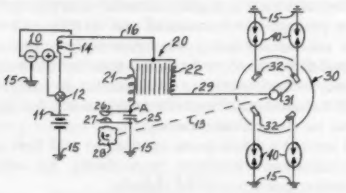


1. An internal combustion engine comprising a reciprocating piston, a main combustion chamber, an auxiliary combustion chamber, at least one chamber forming a possage connecting said main combustion chamber with said auxiliary combustion chamber and arranged to create a swirl motion of the combustible mixture in said auxiliary combustion chamber at the time of the compression stroke of said piston, a spark plug having a spark gap located in one of said chambers at least in the vicinity of said chamber forming the connecting passage, an intake passage for leading an air-fuel mixture into said main combustion chamber, and an exhaust passage for discharging an exhaust gas from said main combustion chamber to the atmosphere, the ratio of the volume of said auxiliary combustion chamber to the cross-sectional area of said chamber forming the connecting passage being in the range of 5 through 15 cm to create a strong swirl motion in said auxiliary combustion chamber, means to maintain the length of the continuance time of the discharging arc created in the spark gap of said spark plug from about BTDC 40° to about BTDC 10° when the engine is operating at a high speed approaching 5000 rpm, and the ignition timing is controllable in accordance with the level of the load on the engine and is at about BTDC 40° when the engine is operating at the high speed under substantially no load and at about BTDC 20° when the engine is operating at the high speed under a substantial load.

4,176,647
MODULATION IGNITION SYSTEM

Martin E. Gerry, 13452 Winthrope St., Santa Ana, Calif. 92705

Filed Jul. 5, 1977, Ser. No. 812,912
Int. Cl.[2] F02P 3/04; H05B 41/14
U.S. Cl. 123—148 E 9 Claims

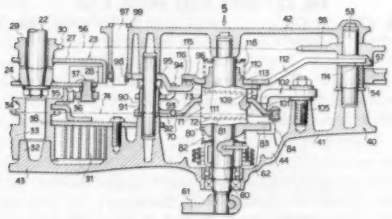


1. An ignition system, comprising the combination of:
first means, intermittently fed by DC power, for producing transient power during operative mode of the system, said first means including an ignition transformer having a primary winding and a capacitor intermittently in series with the primary winding; and
second means, in series circuit with the first means, for providing alternating current power to intermodulate with the transient power in the first means during said operative mode, said second means including an alternating current power source coupled to said capacitor, wherein said power source is duty cycled.

4,176,648
ENGINE STARTING DEVICE

Isamu Gotoh, Tokyo; Yoshinori Okamoto, and Goroei Wakatsuki, both of Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 21, 1977, Ser. No. 779,604
Claims priority, application Japan, Mar. 24, 1976, 51-32096; Apr. 24, 1976, 51-51822[U]
Int. Cl.[2] F02N 5/02
U.S. Cl. 123—179 S 14 Claims

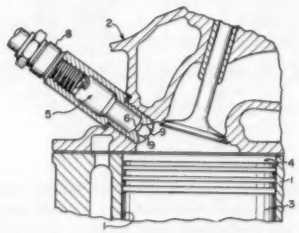


1. An engine starting device, comprising:
an input member mechanically and operably connected to an engine;
a spiral spring;
an output member mechanically and operably connected to said spiral spring;
a driving member operably connected to and driven by said engine;
automatic force accumulating means operably connected to said spiral spring for accumulating force in said spiral spring;
said driving member being operably connected to said automatic force accumulating means for driving said automatic force accumulating means;
a winding pressure accumulating mechanism operably connected to said spiral spring;
a first one-way clutch means for selectively connecting said automatic force accumulating means with said winding pressure accumulating mechanism;
means for connecting said output member to said input member when the force accumulated by said spiral spring is released to start said engine;
said automatic force accumulating operation means for said spiral spring driven by said driving member as a cam driven by a driving shaft of said engine;
an artificial force accumulating operation means operated to accumulate a force in said spiral spring by an artificial operation and said winding pressure accumulating mechanism;
said winding pressure accumulating mechanism and each of said force accumulating operation means being connected with each other through a one-way clutch engaging and disengaging them as required;
a one-way clutch means engaging and disengaging with the engine crankshaft;
a driven sprocket, which is a winding input member for said spiral spring, secured at said one end of said spiral spring;
a driving sprocket driving said driven sprocket; and
an artificial force accumulating operation mechanism and an automatic force accumulating operation mechanism are arranged on both sides of said driving sprocket, respectively, in the axial direction through one-way clutches.

4,176,649
EMISSION CONTROL

Bela Karlovitz, Pittsburgh, Pa., assignor to Toyota Motor Company, Ltd., Toyota, Japan

Continuation of Ser. No. 684,476, May 10, 1976, abandoned. This application Sep. 25, 1978, Ser. No. 945,390
Int. Cl.[2] F02B 19/08, 19/18
U.S. Cl. 123—191 SP 14 Claims



1. A method of operating an internal combustion spark ignition engine having at least one cylinder and a reciprocating piston therein defining a combustion chamber, said combustion chamber being divided into main and auxiliary sections, there being an orifice disposed between the main and auxiliary sections and arranged on a central axis of the auxiliary section, the cross-sectional area of the orifice being smaller than the cross-sectional area of the auxiliary section, comprising the steps of:
introducing a combustible mixture to the combustion chamber;
compressing the combustible mixture in the combustion chamber and thereby forcing part of the mixture in the main section through the orifice into the auxiliary section;
creating turbulence and swirl of the combustible mixture about the axis of and within the auxiliary section for forcing the lighter components of the combustible mixture into the area along the axis by centrifugal force;
igniting the combustible mixture located along the axis of the auxiliary section within the auxiliary section of the combustion chamber from an ignition source, said swirl causing heavier uncombusted components of the combustible mixture to be forced to the peripheral areas of the auxiliary section;
causing a controlled rise in the pressure in the auxiliary section to rapidly inject into the main section a burning jet

of the combustible mixture located along the central axis of the auxiliary section;

causing a gradual propagation of the flame of the ignited mixture toward the periphery of the swirled combustible mixture in the auxiliary section to burn the heavier uncombusted portions of the combustible mixture and to continue to inject a long-burning jet into the main section; and

causing the burning jet to escape through the orifice substantially without swirling motion into the main section creating sufficient turbulence therein to cause part of the mixture to burn at substantially constant volume followed by a substantially constant pressure burning of the rest of the mixture whereby the peak temperature of the cycle is limited and the NO_x emissions are reduced.

4,176,650

METHOD FOR OPERATING A MULTI-CYLINDER JUMP-SPARK IGNITION ENGINE AND OPERATION CONTROL SYSTEM THEREOF

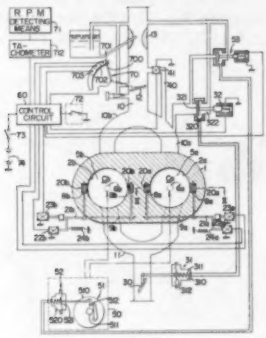
Masaaki Noguchi, Nagoya; Yukiyasu Tanaka, Okazaki, and Taro Tanaka, Chiryu, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Feb. 3, 1978, Ser. No. 874,931

Claims priority, application Japan, Feb. 10, 1977, 52/13591; Feb. 15, 1977, 52/15263; Feb. 18, 1977, 52/17479; Mar. 4, 1977, 52/24273

Int. Cl.[2] F02D *13/06*

U.S. Cl. 123—198 F **33 Claims**



1. Method for operating a multi-cylinder internal combustion engine comprising the steps of:

throttling both a suction flow of air-fuel mixture newly supplied to a first combustion chamber and an exhaust flow of combustion gas flowing out of said first combustion chamber, or throttling only said exhaust flow during a non-load operation of the engine to cause compression ignition combustion to occur in said first combustion chamber; and

stopping a suction flow of air-fuel mixture newly supplied to a second combustion chamber during said non-load operation to stop combustion operation in said second combustion chamber.

12. A 2-cycle internal combustion engine comprising:

a cylinder having first and second cylinder bores;

first and second pistons reciprocally disposed in the respective cylinder bores;

a cylinder head cooperating with said cylinder and said pistons to define first and second combustion chambers, respectively;

first and second spark plugs exposed to said first and second combustion chambers, respectively, for igniting air-fuel mixture introduced therein by spark discharges;

an ignition control device for supplying ignition energy to said first and second spark plugs at respective ignition timings;

means disposed in a suction passage for producing said air-fuel mixture;

a throttle valve pivotally disposed in said suction passage downstream of said air-fuel mixture producing means for controlling the amount of said air-fuel mixture;

first and second suction manifold branches connected to said suction passage downstream of said throttle valve;

first and second suction ports operatively communicated with said first and second suction manifold branches, said first and second suction ports opening to said first and second combustion chambers, respectively, for introducing said air-fuel mixture thereto;

first and second exhaust ports opening to said first and second combustion chambers, respectively, for exhausting combustion gases produced therein;

an exhaust manifold connected to said exhaust ports for conveying the combustion gases to an atmosphere;

first throttle means arranged in at least one of said first suction port, said first exhaust port and said first exhaust manifold, for throttling at least one of a suction flow of the air-fuel mixture supplied to said first combustion chamber through said first suction port and an exhaust flow of the combustion gas flowing out of said first combustion chamber through said first exhaust port and said first exhaust manifold, during non-load operation of said engine, to cause compression ignition operation to occur in said first combustion chamber; and

second throttle means arranged in at least one of said second suction port and said second suction manifold for stopping the supply of suction flow of the air-fuel mixture supplied to said second combustion chamber through said second suction port, during said non-load operation of said engine, to stop combustion operation in said second combustion chamber.

4,176,651

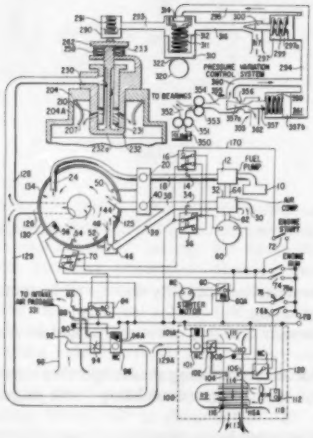
ENGINE COMBUSTION SYSTEM

Harold A. Backus, Wynnewood, Pa., assignor to Backus Devices, Incorporated, Wynnewood, Pa.

Continuation of Ser. No. 683,813, May 6, 1976, abandoned. This application Feb. 7, 1978, Ser. No. 875,806

Int. Cl.[2] F02B *3/00;* **F02M** *7/00*

U.S. Cl. 123—27 GE **10 Claims**



1. A combustion system comprising means defining a combustion volume, fuel control means for intermittently releasing pressurized gaseous fuel into said combustion volume for combustion with air contained in said volume in a cyclic process,

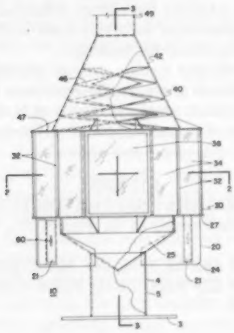
said fuel control means including means, including valve means defining an orifice which opens and closes during each cycle and the maximum opening of which is variable from cycle to cycle, for varying the said maximum opening of said valve means substantially in direct proportion to the cyclic frequency so as to correspondingly limit the ratio of fuel to air for each cycle of operation of the system, for limiting the total quantity of fuel flow of each cycle, and for causing the rate of fuel flow per cycle to vary substantially in accordance with the cyclic frequency, further comprising means for supplying combustion air to said combustion volume and means for preheating said combustion air to temperature above the critical temperature for autoignition of the gaseous fuel and air prior to the release of said gaseous fuel.

4,176,652

FREE STANDING FIREPLACE

Verland V. Berg, 393 Silver City Dr., Boise, Id. 83704, assignor to Verland V. Berg, Boise and Raymond Tracy, Cascade, both of, Id.

Filed Aug. 19, 1977, Ser. No. 825,969
Int. Cl.[2] F24B *7/00*
U.S. Cl. 126—121 **3 Claims**



1. A free standing fireplace comprising:
a base;
a firepot mounted on said base;
a substantially cylindrical combustion chamber mounted on said base and enclosing said firepot, said combustion chamber including a housing ring encircling said firepot, the housing ring having oppositely disposed downwardly depending air vents opening in opposite directions, a plurality of vertically extending, parallel support braces circularly spaced upon the housing ring, a second housing ring horizontally mounted upon the support braces, a plurality of tempered glass panels vertically disposed between the support braces, sealingly engaging the support braces and the first and second housing rings, and a door operable to open and close said chamber; and
a conical hood having its base sealingly engaging said chamber, said hood having a flue vent at its apex, and said hood having a substantially horizontally projecting, upwardly spiraling flange mounted to its interior wall for imparting a circular motion to combustion fumes.

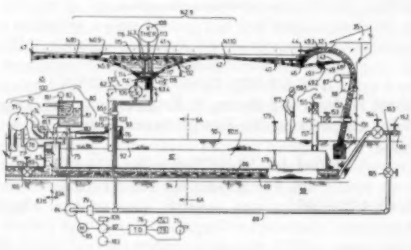
4,176,653

INFLATABLE ENCLOSURE AND ENERGY EXCHANGE SYSTEM

Turner J. Pittman, P.O. Box 24, Logan, N. Mex. 88426

Filed Feb. 22, 1977, Ser. No. 770,264
Int. Cl.[2] F24J *3/02*; F24H *7/00*
U.S. Cl. 126—428 **5 Claims**

1. A substantially air-tight enclosure comprising a vertically elongated roof edge support assembly, a roof portion, an internal structural support assembly, a blower system, and a heat transfer system and an air inlet system, said enclosure comprising vertically extending air-tight walls supported on the ground and a roof formed of a thin and flexible water-tight and air-tight sheet supported on said walls, said sheet forming the roof being formed into a regular array of a plurality of dimpled downwardly extending upwardly open incremental roof reservoirs of substantially the same shape and size and holding volumes of water that are shallow and wide and separate from each other and have similar surface-volume characteristics,
and an excess of air-pressure in the enclosure over air pressure outside the air-tight enclosure holds some portions of the roof upward to raised positions and a rigid ground-attached frame structure is attached to other portions of the sheet forming said roof reservoirs, said roof reservoirs being connected to upper terminal portions of liquid conduits extending vertically to horizontally extending liquid conduits located in chambers in the ground, walls surrounding said chambers, said chambers and said walls forming ground heat reservoirs, and wherein
(a) the roof edge support assembly comprises a wall structure and a tensioning member, a tension support and a roof sealing member, said wall structure comprising a circular imperforate air-tight rigid vertically extending peripheral wall which is fixed to a foundation and has substantial thickness and rigidity and an air-tight annular horizontally extending raised central wall portion that extends centrally and horizontally from the upper end of said peripheral wall,
(b) said roof portion comprises said roof and a plurality of



shallow bodies of water located on a thin imperforate air-tight flexible yet dimensionally stable sheet and said flexible sheet extends from one side of the roof edge support assembly to the other and is formed into an array of a plurality of downwardly dimpled surfaces and upwardly convex surfaces,
(c) said rigid ground attached frame structure comprises a plurality of generally like internal frame subassemblies arrayed in an axially symmetrical arrangement and
(d) each frame subassembly comprises a pair of like rigid vertically extending support posts, intermediate radial rails, and tangential rails, and said posts are firmly supported at their lower end in the ground and are rigid and, at their upper ends are firmly attached to and support an elevated radially and horizontally extending rigid rail and said horizontally extending rail supports and is attached firmly to a plurality of rigid, elevated, horizontally and tangentially extending and longitudinally extensible tangential rail assembies, and said tangential rail assemblies support thereonplurality of upper conduit terminal support assemblies, and
(e) each said upper conduit terminal support assembly comprises a rigid high level vertical pipe and a rigid low level vertical pipe, an upper rigid clamping plate and a lower rigid clamp plate, the high level pipe and a low level pipe are firmly attached to upper plate, the upper plate and the lower plate are firmly attached together and clamp therebetween a portion of the sheet forming the roof portion, said low level pipe has a automatically closing valve at its

upper end, and the upper open end of the high level pipe is higher than the upper open end of the low level pipe

(f) said blower system comprising an air pump, a motor and a pressure control arranged so that the pump drives air into the enclosure under said roof, said pressure control being sensitive to the pressure in the enclosure and operatively connects a power source to said motor, and an entrance assembly comprising a pair of closable doors spaced apart by an entrance enclosure which provides for ingress to and egress from a ground surface located within said enclosure under said roof while maintaining the air pressure in said enclosure,

(g) said blower having an inlet located in said chambers and two discharge outlets, said first discharge outlet attached by a plurality of air distributor pipes to outlets in said enclosure and said second discharge outlet attached to means for applying pressure to the water in said conduits in said ground heat reservoirs,

(h) said air inlet system comprising valved air duct assemblies, each such air duct assembly comprising a first inlet duct with an orifice located outside of the wall; said duct connects to a tee through a valve openable to said enclosure and another arm of said tee connects to said chambers in the ground, and

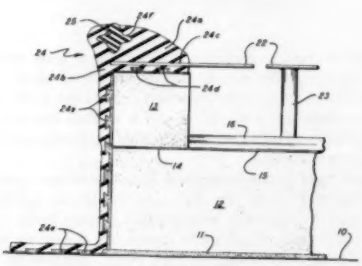
(i) said heat transfer system comprises a heater tank operatively connected to each of said conduits in said chambers in the ground and to said bodies of water in said roof reservoirs.

4,176,654

SOLAR HEATING APPARATUS

Michael F. Zinn, and Steven E. Krulick, both of Spring Glen, N.Y., assignors to Bio-Energy Systems, Inc., Spring Glen, N.Y.

Filed Jul. 18, 1977, Ser. No. 816,883
Int. Cl.[2] F24J *3/02*; F28F *1/32*
U.S. Cl. 126—448 **31 Claims**



1. In a solar collector, the improvement comprising:

(a) at least one fluid-conducting strip of flexible synthetic rubber having an undersurface opposite a radiation-receiving surface, and comprising

i. a plurality of spaced parallel hollow tube portions,

ii. a plurality of web portions joining adjacent pairs of said tube portions, and

iii. a plurality of deflectable projections on the undersurface of said strip defining a plurality of inwardly diverging recesses; and

(b) a deposit of cement which does not substantially bond to said synthetic rubber disposed against the undersurface of said strip and within said recesses;

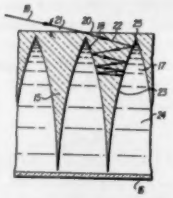
(c) whereby said strip is securable to a base by said cement and is removable by pulling the strip away from the base so that the cement emerges from the recesses.

4,176,655

SOLAR ENERGY COLLECTION SYSTEM AND APPARATUS FOR SAME UTILIZING LATENT ENERGY STORAGE FLUID

Sidney Levy, 145 W. Cuthbert Blvd., Oaklyn, N.J. 08107

Filed Apr. 26, 1977, Ser. No. 791,044
Int. Cl.[2] F24J *3/02*; C09K *3/18*; F03G *7/02*
U.S. Cl. 126—436 **19 Claims**



1. A solar energy collector system comprising a lenticulated collector, and substitute-an energy storage fluid comprising a dispersion of a crystalline polymer in a carrier fluid means for controllably circulating said energy storing fluid through said lenticulated collector panel and thence on to a heat engine and a heat exchanger whereby the energy collected in said energy storage fluid is converted to useful shaft work and also exchanged with other fluids for heating.

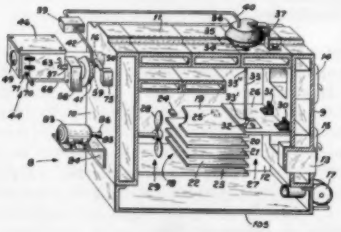
15. A solar collector system energy storage fluid which comprises a dispersion of a crystalline polymer in a heat transfer fluid whereby heat energy is stored as both sensible heat and as latent heat of crystallization in said storage fluid.

4,176,656

NITROGEN-HEAT SEPARATOR FURNACE

Alexander F. Komorowski, 69 E. Fourth St., Bayonne, N.J. 07002

Filed Apr. 10, 1978, Ser. No. 894,895
Int. Cl.[2] F28D *19/00*; F24H *7/00*
U.S. Cl. 126—400 **2 Claims**



1. A nitrogen heat separator furnace comprising:

(a) an enclosure having a front, back, top, sides and a base and formed with doors on the front for access to the interior of the enclosure;

(b) a fuel burner mounted in the enclosure;

(c) a furnace temperature control;

(d) an outside temperature control electrically connected to the furnace temperature control to activate the furnace temperature control when outside temperatures fall to a predetermined level;

(e) a plurality of heat absorbing elements containing passages mounted in the central area of the enclosure inward from the front and back walls to provide a front gas passage and rear gas passage for hot gas flow around the heat absorbing elements and through the elements;

(f) a fan operatively mounted at the rear of the enclosure to circulate the heated gas through the enclosure when the fuel burner stops operating;

(g) a baffle movably mounted on the inner face of the front

wall being of a predetermined size to extend horizontally from the front wall to the top front edge of the heat absorbing elements and between the side walls;

(h) a baffle rod mounted on the upper face of the baffle;

(i) an exhaust port formed in the upper part of the wall of the enclosure;

(j) a flue pipe connected to and extending outwardly from the exhaust port;

(k) a curtain housing mounted outside of the enclosure at the end of the flue pipe, the curtain housing having a front wall formed with an opening to contain the end of the flue pipe, a back wall formed with an opening leading to a chimney, a top, two side walls and a base;

(1) a movably mounted draft-diverter door being formed in one side wall, said door being closed during the fuel combustion phase of operation of the furnace;

(2) moving means attached to the draft-diverter door;

(3) a heat seal formed inside the front wall, the seal being a frame having a top, two sides and a base, the frame being affixed against the front wall of the curtain housing with its opening surrounding the opening to the flue pipe;

(4) a support channel mounted horizontally across the center of the top of the heat seal;

(5) a heat retaining curtain of inflammable flexible material affixed into the support channel and covering the opening of the frame;

(6) a crank shaft movably mounted through the top of the heat seal between the heat retaining curtain and the front edge of the heat seal, the crank shaft being formed with two downwardly extending arms spaced to lift the heat retaining curtain up into the curtain housing;

(7) pivot connection means operably connected to the shaft and to the pull rod attached to the draft-diverter door to simultaneously raise the arms of the shaft lifting the heat retaining curtain and close the draft-diverter door and thereafter to simultaneously lower the arms of the shaft and open the draft-diverter door;

(8) electronic switching means connected to the pivot connection means;

(l) an air compressor;

(m) tubing;

(n) two diaphragm housings, each having a diaphragm partition, each housing being connected to the air compressor by tubing, one diaphragm housing being connected to the baffle rod attached to the baffle and the second diaphragm housing being attached to the pivotal connection means of the curtain housing; and

(o) an electrical stack relay operatively connected to the furnace temperature control and outside temperature control and formed to send out current in two legs, one leg being connected to the electronic switching means which is operatively connected to the pivotal connection means of the curtain housing and the second leg connected to activate the air compressor, whereby when the thermostat control is activated, the air compressor will operate to force compressed air into the two diaphragms, one diaphragm forcing down the baffle rod within the enclosure so that the baffle will be down and hot air will be directed into the heat absorbing elements and the second diaphragm moving the pivot connection means connected to the curtain housing, raising the heat retaining curtain, closing the draft diverting door and closing the pivot control switch, which closes the electrical circuit within the furnace to activate the oil burner; when the thermostat has been satisfied the circuit is broken, the air compressor stops, the pivot connection means reverse, the heat retaining curtain falls, the draft diverter door opens to provide a through furnace draft and the pivot control switch opens.

4,176,657

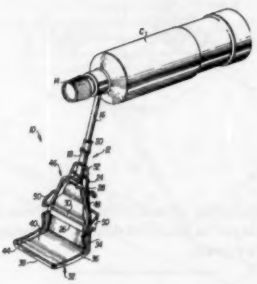
APPARATUS FOR WAXING SKIS

Åke Eriksson, Upplands Väsby, and Åke Norin, Järfälla, both of Sweden, assignors to Primus-Sievert AB, Sundbyberg, Sweden

Filed Oct. 28, 1977, Ser. No. 846,353

Int. Cl.[2] F24J *3/00*; F23C *5/02*

U.S. Cl. 126—401 **6 Claims**



1. Apparatus for waxing skis comprising a waxing iron, a gas burner assembly including controllable valve means for attaching said burner assembly to a can of gas, said burner assembly having a burner head, means for releasably attaching said waxing iron to said burner assembly, said waxing iron having a substantially L-shaped longitudinal cross-sectional profile and including a leg portion for receiving said burner head and a base portion for spreading wax over the sole of a ski, said base portion including a plate having top and bottom surfaces, said top surface defining a trough for receiving and retaining a flame emanating from said burner head and adapted to heat said waxing iron, and wherein said bottom surface has a convex configuration whereby only a limited portion of the surface area thereof may contact the surface of a ski thereby preventing burning of the ski or the wax being spread thereon, wherein said means for releasably attaching said waxing iron to said burner assembly is a quick connect-disconnect device including a resilient snap element, said releasably attaching means further including a U-shaped rod pivotally connected at the ends thereof to said waxing iron, said resilient snap element comprising a resilient wire having a generally U-shaped configuration with a bight portion and two leg portions and wherein said leg portions are bent back upon themselves defining a generally V-shaped longitudinal cross-section, the bight portion of said resilient wire being pivotally connected to said U-shaped rod, and wherein when said waxing iron is attached to said burner assembly said resilient wire is pivoted in a first direction and the bent back leg portions thereof snapped under one side of said burner assembly thereby pivoting said U-shaped rod down against the other side of said burner assembly.

4,176,658

ULTRASONIC ECHOGRAM DISPLAY

George Kossoff, Northbridge, and David E. Robinson, Avalon Beach, both of Australia, assignors to The Commonwealth of Australia, Phillip, Australia

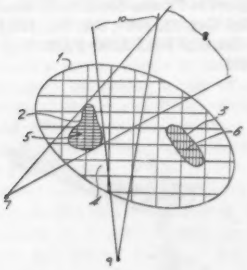
Filed May 8, 1975, Ser. No. 575,714

Int. Cl.[2] A61B *10/00*; G01N *29/00*

U.S. Cl. 128—660 **2 Claims**

1. A method of displaying information obtained by ultrasonic echoscopic examination of an object, said examination comprising the steps of transmitting pulses of ultrasonic energy into the object and receiving echoes of said pulses of ultrasonic energy reflected by acoustic impedance discontinuities within the object, which method comprises forming a first display of information representative of the position of acoustic impedance discontinuities within said object, analyzing said echoes to obtain information representative of additional parameters such as velocity of propagation, scattering properties and

attenuation characteristics of said object and simultaneously displaying in said first display said information representative



of additional parameters of said object, wherein the additional information displayed in said first display is displayed by means of changes in gray scale.

4,176,659

CATHETER WITH MEASUREMENT ELECTRODES

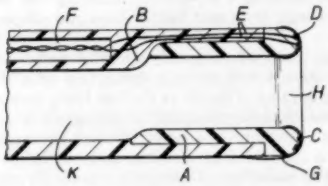
Peter Rolfe, 9, Henwood Dr., Boars Hill, Oxford, England

Filed Jul. 19, 1977, Ser. No. 816,950

Claims priority, application United Kingdom, Jul. 21, 1976, 30288/76

Int. Cl.[2] A61B 5/00

U.S. Cl. 128—635 8 Claims



1. A catheter comprising a tubular body which defines therewithin a passage which extends to an axially-facing open end of the tubular body and which serves as a sampling port at the tip of the catheter, said catheter further comprising first and second annular electrodes which are arranged in spaced relationship on the rim of the said open end around the sampling port, and electrical connection means for connecting said first and second electrodes to measuring equipment.

4,176,660

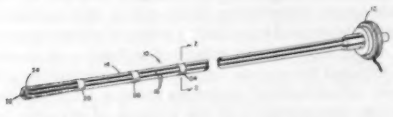
DISPOSABLE ESOPHAGEAL AND TRACHEAL MULTI-PROBES

Kenneth C. Mylrea, Tucson, Ariz., and Joseph Demer, Baltimore, Md., assignors to University Patents, Inc., Norwalk, Conn.

Filed Mar. 10, 1978, Ser. No. 885,173

Int. Cl.[2] A61B 5/02

U.S. Cl. 128—671 6 Claims



1. A disposable esophageal probe comprising a flexible plastic tube having proximal and distal portions and an unobstructed lumen, said tube adapted to be inserted into a patient's mouth and then into the esophagus:

a plurality of conductive pathways longitudinally embedded in the wall of said plastic tube, said pathways having substantially similar flexibility to said plastic tube and being insulated from each other and the patient by the plastic of said tube;

at least a pair of conductive bands encircling said tube's distal portion, each band making contact with at least one embedded conductive pathway and being adapted to receive ECG signals and

a connector plug mounted on the proximal portion of said plastic tube, said connector plug having a plurality of sharp metal connecting pins which pierce and electrically connect to said conductive pathways, said plug further having an unobstructed lumen which mates with the lumen of said tube.

4,176,661

PHOTOENDOSCOPE HAVING A DISTAL ELECTRONIC FLASH-TUBE GUARD

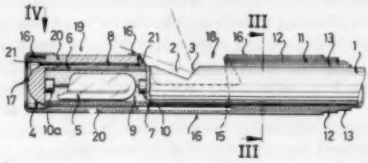
Herbert Schubert, and Siegfried Hiltebrandt, both of Knittlingen, Fed. Rep. of Germany, assignors to Richard Wolf GmbH, Knittlingen, Fed. Rep. of Germany

Filed Sep. 20, 1977, Ser. No. 834,864

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1976, 2643233

Int. Cl.[2] A61B 1/04

U.S. Cl. 128—6 4 Claims



1. In a photoendoscope comprising a telescope tube defining a viewing port near its distal end, flash-tube assembly means connected to the distal end of the telescope tube and including a flash-tube proper enveloped in transparent protective sheath means, arranged in a housing defining an aperture for transmitting light from the flash-tube proper, and light conductor means extending along the telescope tube and terminating proximally of said viewing port, the improvement comprising:

(a) a barrel enclosing the flash-tube assembly means and at least the distal end regions of the telescope tube and the light conductor means,

(b) two apertures formed in the barrel and aligned respectively with the viewing port and with the flash-tube assembly light transmitting aperture,

(c) a transparent cylindrical sheath which is secured in the barrel and which covers the flash-tube assembly light transmitting aperture, said transparent cylindrical sheath having a wall thickness which is greater where it covers said flash-tube assembly light transmitting aperture than in the remainder of the sheath.

4,176,662

APPARATUS FOR ENDOSCOPIC EXAMINATION

Robert E. Frazer, La Canada, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

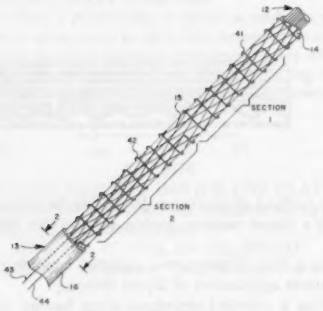
Filed Jun. 17, 1977, Ser. No. 807,597

Int. Cl.[2] A61B 1/06; A61M 25/00

U.S. Cl. 128—6 2 Claims

2. An endoscope having a sheath comprised of an inner

plastic tube, a braided metal tube over the inner tube, and a plastic outer tube over the braided metal tube with a material in the interstices of the braided metal tube and the space between the inner and outer plastic tubes which has a very sharp melting point slightly above body temperature, said sheath



having different sections wound with insulated heating wires around the braided metal tube and inside the outer tube, and separate insulated wires inside the outer tube to the different heating wires for control of the rigidity of said sheath by sections from the proximal end of the endoscope.

4,176,663

MEDICAL VENTILATION APPARATUS

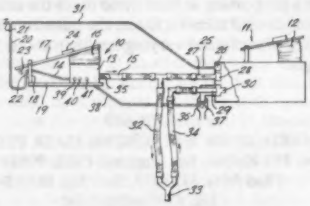
Anthony M. Hewlett, Harrow, England, assignor to National Research Development Corporation, London, England

Filed Oct. 4, 1977, Ser. No. 839,381

Claims priority, application United Kingdom, Oct. 5, 1976, 41302/76

Int. Cl.[2] A61M *16/00*

U.S. Cl. 128—204.26 **11 Claims**



1. Medical ventilation apparatus comprising:

a pre-set volume flow rate supply of gas, a constant pressure primary reservoir having a first preselected volume connected to said supply, gas delivery means connected to said primary reservoir to convey gas therefrom to a patient on demand for spontaneous respiration, a secondary reservoir having a second preselected volume, means for passing any excess of gas from said supply to said primary reservoir over said first preselected volume to said secondary reservoir, said secondary reservoir being connected to said delivery means, control means operable in response to accumulation of said first preselected volume of gas in said primary reservoir and said second preselected volume of gas in said secondary reservoir to forceably deliver gas to the patient from said secondary reservoir for artificial respiration.

4,176,664

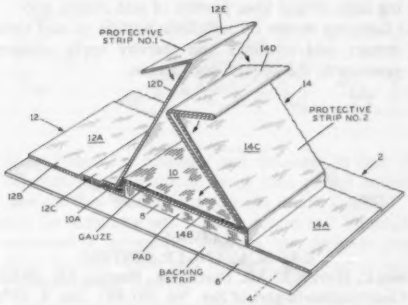
IMPREGNATED BANDAGE

Stanley Kalish, 2727 De Anza Rd., M-22, San Diego, Calif. 92109

Filed Mar. 13, 1978, Ser. No. 885,620

Int. Cl.[2] A61L *15/00*

U.S. Cl. 128—156 **22 Claims**



1. An impregnated bandage comprising:

(a) a backing having an adhesive surface on one side;

(b) an absorbent pad positioned partially along the length and intermediate the ends of the adhesive strip;

(c) a first protective strip attached to one portion of the adhesive extending beyond one end of the absorbent pad;

(d) a second protective strip having a first leg connected to a second portion of the adhesive extending beyond the other end of the absorbent pad;

(e) said second protective strip having a second leg positioned on the top of the absorbent pad;

(f) an impregnated gauze strip positioned in face-to-face engagement with the upper surface of said second leg of said second protective strip.

4,176,665

STOCKING KNEE BRACE

George I. Terpening, Telford, Pa., assignor to Acro Matic Inc., Warrington, Pa.

Filed Oct. 20, 1977, Ser. No. 843,810

Int. Cl.[2] A61F *1/60*

U.S. Cl. 128—165 **5 Claims**

1. A stocking knee brace comprising a form fitting sheath

having a knee portion, shin portion, and foot portion, which sheath is adapted to encircle the leg of a person from a position below the ankle to a position above the knee, including

(a) a U-shaped elastic strap inside said sheath, the ends of said strap being secured to said shin portion of said sheath while the strap portion intermediate said ends provides means for engaging the foot of said person,

(b) a pair of vertically elongated openings located on opposing sides of said knee portion of said sheath, and

(c) fastening means on said knee portion of said sheath to restrict said openings and thereby apply compressive pressure to the knee of said person.

4,176,666

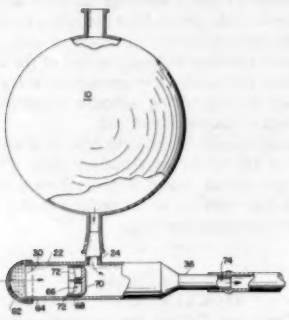
GAS SCAVENGER SYSTEM

Thomas C. Hovey, 23 Mt. Desert Dr., Bangor, Me. 04401

Continuation-in-part of Ser. No. 691,357, Jun. 1, 1976, abandoned. This application Oct. 3, 1977, Ser. No. 838,568

Int. Cl.[2] A61M *17/00*

U.S. Cl. 128—205.24 **7 Claims**



1. A gas scavenger apparatus comprising an accumulating bag, said accululating bag having a pair of openings therein, one of said pair of openings for coupling to a patient's anesthetic circuit, accumulator bag emptying means defining a passageway having first and second inlet parts and an outlet part, said second inlet part located intermediate said first inlet part and said outlet part, vacuum means connected to said outlet part, valve means coupled intermediate said first inlet part and said second inlet part for selectively admitting surrounding air into said passageway, said other of said pair of openings of said accumulating bag for selectively emptying said accumulating bag being connected to said second inlet part of waste gas accumulated therein when said valve means are closed and to discharge said waste gas simultaneously into said vacuum means, bias means for urging said valve means in said closed position when said waste gas is being emptied, said accumulating bag emptying means admitting said surrounding air and simultaneously emptying said accumulating bag when said valve means is in an open position, means to filter said surrounding air passing through said first inlet part when said valve means is in said open position, said valve means including a disc shaped rubber-like member and a flat valve seat, said valve seat having an opening therein, said disc shaped rubber-like member being disposed closing said opening in said flat valve seat when said valve means is in said closed position, the marginal edges of said disc being disposed outwardly from said valve seat when said valve means is in said open position.

4,176,667

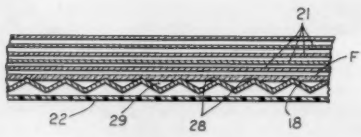
DISPOSABLE LIQUID ABSORBENT PAD AND METHOD

Julian N. Herring, Greenwood, S.C., assignor to Adult Care Products, Inc., Greenwood, S.C.

Filed Oct. 25, 1977, Ser. No. 845,377

Int. Cl.[2] A61F *13/16;* **A61L** *15/00;* **A61F** *13/00*

U.S. Cl. 128—287 **3 Claims**



1. The method of making a disposable liquid absorbent pad for use as a diaper sanitary napkin and the like comprising the steps of:

forming a film of polymeric material capable of forming a gel upon application of liquid thereto;

providing a crinkled absorbent sheet having apex portions for receiving said film thereacross; and

producing a controlled amount of gel on said film forming a limited bond with said sheet at the apex portions facilitating wicking of liquid applied to the pad thus formed through voids between apex portions of said crinkled absorbent sheet.

4,176,668

NOVEL RECONSTITUTED TOBACCO SHEETS AND PROCESS

Joseph V. Fiore, Fairfield, and John M. Slanski, Trumbull, both of Conn., assignors to AMF Incorporated, White Plains, N.Y.

Filed May 2, 1977, Ser. No. 793,232

Int. Cl.[2] A24B *3/00, 3/14*

U.S. Cl. 131—17 A **23 Claims**

1. A reconstituted tobacco sheet coated on at least one surface thereof with a hydrophobic coating comprising ethylcellulose and substantially uniformly dispersed therein, a spectrophotometrically-determinable, pharmacologically-acceptable metal cation, naturally occurring in tobacco wherein the weight ratio of said metal cation to ethyl cellulose is from about 1:30 to about 1:80, and said metal cation is present in said coating in a proportion at least three times the amount naturally-occurring in said tobacco sheet, the quantity of said coating per unit area of said sheet varying less than about 5% along the sheet length.

4,176,669

METHOD OF ATTACHING HAIR PIECES

Don Levin, 453 Kelton, Los Angeles, Calif. 90024

Filed May 31, 1977, Ser. No. 801,554

Int. Cl.[2] A41G *3/00*

U.S. Cl. 132—53 **4 Claims**

1. A method of attaching a hair piece to cover a bald area on

a person's head wherein the contour of the hair supporting base material of the hair piece has been cut to correspond to the perimeter of the bald area, including the steps of:

(a) coating the perimeter of said bald area with a bonding material which penetrates the pores of the skin and cures in the presence of water to define a marginal track about the peripheral edge of the bald area which is effectively mechanically locked to the scalp;

(b) embedding a reinforcing material in said marginal track while in a tacky state so as to be retained in its set position after said bonding material completely dries; and

(c) stitching the periphery of said hair supporting base material of said hair piece to said reinforcing material in said marginal track.

4,176,670

STORING AND FEEDING DEVICE FOR FLAT PARTS

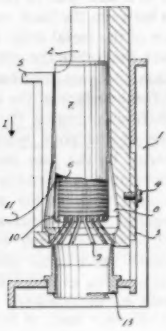
Pierre Repetti, Prilly, Switzerland, assignor to Systems and Technics S.A., Gland, Switzerland

Filed Feb. 17, 1978, Ser. No. 878,943

Claims priority, application Switzerland, Feb. 21, 1977, 2122/77

Int. Cl.² G07D *1/00*

U.S. Cl. 133—4 R **9 Claims**



1. Storing and feeding device for flat parts characterized by the fact that it comprises a tube having at least one portion of its internal cross section such that the parts slide freely within the tube and one end portion of which presents an internal wall widening towards the outside, by the fact that the tube comprises, near its widened open end, retaining means defining in storage position an area of smaller dimension than the cross section of the parts to be stored, by the fact that the tube is slidably mounted on a support provided with opening means adapted to widen the retaining means and to liberate the parts in order to feed a machine with which said support cooperates, and by the fact that the flat parts are provided with a packaging comprising an opening strip and at least a sealing flange, the opening strip being accessible from the outside of the tube through a longitudinal opening provided in its wall.

4,176,671

FAST RESPONSIVE VALVE

Paul S. Citrin, Danbury, Conn., assignor to Indicon Inc., Brookfield Center, Conn.

Filed Feb. 21, 1978, Ser. No. 879,532

Int. Cl.² F16K *31/02*

U.S. Cl. 137—1 **11 Claims**

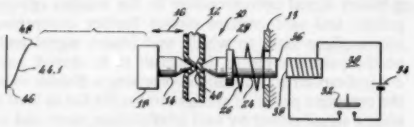
1. A valve for controlling fluid flow through a conduit comprising

a drive element operatively disposed relative to the conduit for repetitive movement between partial fluid flow inhibiting and enabling positions;

means for operatively moving said drive element repetitively between said positions;

a follower mounted generally opposite the drive element to move between fluid flow inhibiting and enabling positions which are complementary to the fluid flow inhibiting and enabling positions of the drive element to effect fluid flow control through the conduit;

means for effectively coupling said follower to the moving means for cooperative repetitive movement with the drive element between said complementary positions;



holding means for retaining said follower in one of said complementary positions for a time period selected to alter the flow of fluid through the conduit; and

means for actuating said holding means and interrupt said cooperative movement between the follower and the drive element when said follower is driven to said one complementary position.

4,176,672

MIXING APPARATUS FOR A FIRST LIQUID COMPONENT WITH AT LEAST ONE ADDITIONAL COMPONENT

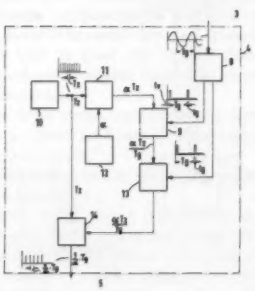
Hartmut Borberg, Munich, Fed. Rep. of Germany, assignor to Apparatebau Gauting GmbH, Gauting and Ernst Muller KG., Winnenden, both of, Fed. Rep. of Germany

Filed Dec. 23, 1977, Ser. No. 863,732

Claims priority, application Fed. Rep. of Germany, Nov. 1, 1977, 2700875

Int. Cl.² G05D *11/13*

U.S. Cl. 137—99 **2 Claims**



1. An apparatus for mixing a first liquid component with at least one additional liquid component, comprising:

a supply line for each of the components; a fluid flow-through measuring device connected to said supply line for said first component and generating a number of electrical pulses corresponding to the flow volume; a feed pump connected to said supply line for each additional component; an electric driving motor for each feed pump; and a current supply circuit for each driving motor maintaining an adjusted mixing ratio, and to which pulses generated by said flow-through measuring device are fed, wherein said flow-through measuring device is a gear pulser, said driving motor is a stepping motor, said feed pump is a geared pump, and said current supply circuit is a control circuit for generating control pulses, said control circuit comprising a signal processing circuit to which impulses generated by said flow-through measuring device are fed and which generates needle pulses therefrom whose time duration (t_g) is short in relation to the pulse

recurrence time (T_g), said control circuit also comprising a pulse generator which generates pulses with a much shorter recurrence time (T_z) than said flow-through measuring device, and said control circuit also comprising a counter to which the pulses of said pulse generator are fed as counting pulses, either completely or partially depending on the desired mixing ratio (α), and said needle pulses are fed as restorer pulses, and which generates at its output a binary signal corresponding to the number of counted pulses, and said control circuit further comprising an intermediate store to which said binary signal and said needle pulse are fed as the signals to be stored, and said control circuit additionally comprising a divider to which the complete pulses of said generator are fed as well as the binary signal stored by said intermediate store and which generates at its output the control pulses for said stepping motor whose pulse recurrence time (T_g/α) is equal to the pulse recurrence time (T_z) of the pulses generated by said pulse generator divided by the number $\alpha T_z/T_g$ coresponding to the binary signal.

4,176,673

PURGED SLIDING GATE VALVE

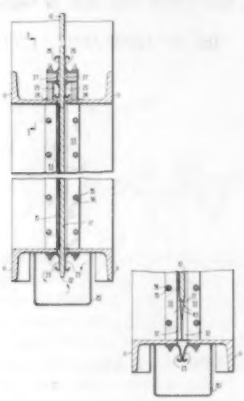
Peter J. Connor, Bethlehem, Pa., assignor to Mosser Industries, Inc., Bethlehem, Pa.

Continuation-in-part of Ser. No. 802,892, Jun. 2, 1977, Pat. No. 4,093,245. This application Dec. 19, 1977, Ser. No. 862,133

The portion of the term of this patent subsequent to Jun. 6, 1995, has been disclaimed.

Int. Cl.[2] **F16K** *3/02;* **F23L** *13/06*

U.S. Cl. 137—240 **21 Claims**



1. In a sliding gate valve comprising

a housing having a fluid flow opening therethrough and an aperture in its wall;

a gate member having opposite upstream and downstream faces and terminating in peripheral edges, said gate member being adapted for sliding movement through the aperture between valve-open position, wherein the gate member is withdrawn from the housing, and valve-closed position, wherein the gate member extends through the aperture and into the housing to restrict the flow of fluid through the housing, two of the peripheral edges of the gate member being side edges, by which is meant opposite edges which are parallel to the direction of sliding movement of the gate member, and one of the peripheral edges being a forward edge, by which is meant the leading edge during movement of the gate member from valve-open position to valve-closed position;

means forming an enclosed void space between at least one of the gate member side edges and the adjacent wall of the housing when the gate member is in the valve-closed position, said void space running substantially the entire length of the side edge, said void space forming means including sealing means cooperating with the gate member when in the valve-closed position to seal against the leakage of upstream and downstream fluids into the void space; and

means for injecting pressurized fluid from a source external to said housing into said void space;

the IMPROVEMENT wherein said sealing means comprise

a downstream seat mounted on the interior wall of the housing in such a manner that the downstream face of the gate member abuts against the seat when in the valve-closed position, and

an upstream seat assembly comprised of a rigid, elongated channel means mounted on the interior wall of the housing in such a manner that the channel is parallel to and upstream of the gate member when in the valve-closed position, said channel having a back wall and at least one side wall, said back wall being substantially parallel to the plane of said gate member; a rope which is resiliently compressible across its width positioned lengthwise in said channel; and elongated metal strip, with opposing front and rear surfaces, being flexibly attached along the first of its two long edges to a side wall of the channel so as to sandwich the rope between the back wall of the channel and the rear surface of the metal strip; said seat assembly being positioned such that when the gate member is in the valve-closed position the gate member's upstream face presses against the front surface of the metal strip in sealing engagement therewith, urging the strip against the rope, the resilience of the rope providing a pressure counter to that exerted by the gate member; said downstream seat and upstream seat assembly being so adapted that in the valve-open position the metal strip's front surface is urged against the downstream seat in sealing engagement, effectively closing the void space, and in positions intermediate valve-open and valve-closed, a generally triangular opening to said void space is formed immediately in front of the forward edge of the gate member.

4,176,674

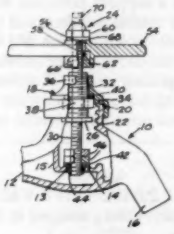
FAUCET REPLACEMENT VALVE STEM ASSEMBLY

Manuel F. Rodriguez, 4234 Avery Ave., Detroit, Mich. 48208

Filed Aug. 16, 1978, Ser. No. 934,027

Int. Cl.[2] **F16K** *43/00*

U.S. Cl. 137—315 **11 Claims**



1. A replacement valve stem assembly for a faucet of the type having a vlave seat positioned in alignment with an apertured cap threaded on the faucet body and through which the valve stem of the faucet normally extends comprising, a sleeve which is threaded both internally and externally and having an outer diameter such as to enable the sleeve to extend through the valve stem aperture in said cap, means engaged with the external threads of said sleeve for fixedly attaching the sleeve to said cap so that the sleeve extends through the cap aperture, an externally threaded valve stem engaged with the internal

threads of said sleeve and having a length substantially greater than said sleeve so that when the sleeve is secured to said cap and the cap is threaded on the faucet body the inner end of said stem terminates beyond the inner end of said sleeve adjacent the valve seat in the faucet body and the outer end of said stem extends outwardly beyond said cap and the outer end of said sleeve, means threaded on the inner end of said stem for securing thereon a valve washer adapted to seal said valve seat when the stem is rotated in one direction within said sleeve and nut members threaded on the outer end of said stem for securing a faucet handle thereto.

4,176,675

FLOATING SEAT BUTTERFLY VALVE

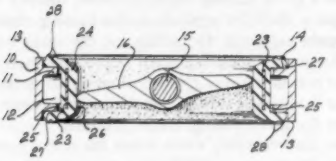
Richard Liberman, Montreal, Canada, assignor to Crane Co., New York, N.Y.

Filed Apr. 19, 1978, Ser. No. 897,613

Claims priority, application Switzerland, Apr. 20, 1977, 276542

Int. Cl.[2] F16K *49/00, 1/22, 25/00*

U.S. Cl. 137—340 **2 Claims**



1. A butterfly valve assembly adapted for positioning between opposing, spaced-apart flanges in a fluid flow system, said assembly comprising:

A. a rigid body having opposing external flat parallel end surfaces adapted to mate with the opposing flanges, said body having opposing internal end surfaces spaced inwards from and having a smaller diameter than said external end surfaces, said body adapted to permit fluid flow therethrough and to accept a valve closure member;

B. a valve closure member rotatably mounted within said body and adapted to cooperate with a seat assembly to regulate fluid flow through said rigid body;

C. a seat assembly adapted to co-operate with said valve closure member between an open position and a closed position, said seat assembly comprising:

i. a flexible steel ring disposed in said rigid body for resilient flexible engagement with an annular seat; and,

ii. an annular seat disposed in said rigid body (supporting said flexible ring), said annular seat is an elastomeric material bonded to and about said flexible ring, said seat assembly and said rigid body defining an annular space therebetween adapted for the passage of a fluid medium therethrough, said seat assembly having an external flange on each end adapted to be clamped between its respective internal end surface and one of the opposing flanges, said external flange on each end extending completely about the flexible steel ring thereby forming a seat for said flexible ring of U-shaped half cross-section configuration; and,

D. an inlet connector and an outlet connector communicating with the annular space and adapted to receive and pass a fluid medium therethrough, whereby rotation of said valve closure member to a closed position forces said seat assembly to deform into the annual space and simultaneously permits fluid to pass from said inlet connector through the annular space to said outlet connector.

4,176,676

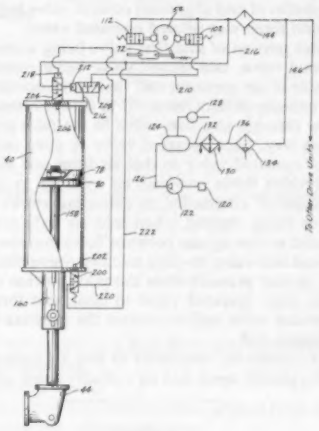
MEANS FOR CONVERTING A WATER DRIVE CENTER PIVOT IRRIGATION SYSTEM TO AIR DRIVE

Loren R. Townsend, Apartment 4, #5 Olympic Gardens, York, Nebr. 68467

Continuation-in-part of Ser. No. 866,558, Jan. 3, 1978. This application May 3, 1978, Ser. No. 902,440

Int. Cl.[2] B05B *3/12*

U.S. Cl. 137—344 **1 Claim**



1. A self-propelled sprinkling system comprising,

a water supply pipe movable about a center pivot point,

a plurality of spaced-apart, wheeled drive towers supporting said supply pipe above the area to be sprinkled,

each of said towers comprising a frame means having a pair of spaced-apart drive wheels rotatably mounted thereon,

a trojan bar means reciprocatably mounted on said frame means and movable between first and second positions for engagement with at least one of said drive wheels for driving said wheel when said trojan bar means moves in at least one direction,

an air operated drive means on each of said towers to propel said towers to move said towers and supply pipe about said center pivot point,

a source of compressed air for supplying air under pressure to said drive means,

said air operated drive means comprising an air cylinder mounted on said frame means and being operatively connected to said trojan bar means to reciprocate said trojan bar means, said air cylinder being movable between extended and retracted positions,

and a control means for controlling the operation of said air cylinders so that the associated tower is propelled at the desired rate relative to the other towers in the system,

said control means including means operatively connected to the source of air pressure and said air cylinder for automatically moving said air cylinder between its fully extended and retracted positions so that said trojan bar means is fully reciprocated between its said first and second positions,

said air cylinder having first and second ends,

said air cylinder having first and second valves mounted on its said first and second ends respectively which have valve plungers positioned in said air cylinders and which are operatively engaged by the piston of said air cylinder when said air cylinder is moved to its fully extended and retracted positions respectively,

said first valve being a three-way, normally closed, plunger and pilot operated valve which is opened when said air cylinder is fully retracted, said first valve having an inlet connected to said source of air pressure, said second valve being a three-way, plunger operated, normally closed,

spring return valve which is opened when said air cylinder is fully extended,

a three-way, pilot operated, normally closed, spring return valve having a pilot portion connected to the outlet of said first valve and an outlet connected to the interior of said air cylinder adjacent said first end,

said control means including an alignment control valve having an inlet operatively connected to said source of air pressure, said alignment control valve permitting system air pressure to flow from its outlet upon being actuated, the outlet of said alignment control valve being connected to said three-way piloted operated valve,

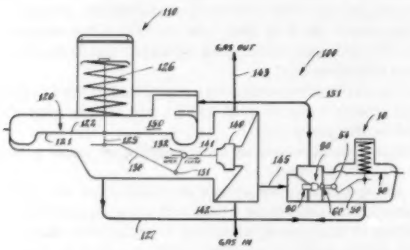
the pilot portion of said first valve being connected to said second valve, said second valve being connected to said source of air pressure, said first valve opening when said air cylinder is fully retracted to permit system pressure to flow through said first valve to the pilot portion of said three-way, pilot operated valve to open said three-way, pilot operated valve so that air from said alignment control valve flows into said air cylinder to cause said air cylinder to commence an extending stroke, said second valve being opened when said air cylinder is fully extended so that system pressure flows into the pilot portion of said first valve to close said first valve thereby exhausting system pressure from the pilot portion of said three-way, pilot operated valve to close said three-way, pilot operated valve and to exhaust the pressure from said air cylinder, and

means operatively connected to said air cylinder to retract said cylinder upon said air cylinder being exhausted.

4,176,677
RELAY PILOT REGULATOR

George C. Hughes, Anderson, Ind., assignor to Textron Inc., Providence, R.I.

Filed Dec. 9, 1977, Ser. No. 859,041
Int. Cl.[2] G05D *16/06*
U.S. Cl. 137—488 11 Claims



1. A relay pilot regulator for use in combination with a main regulator in a gas distribution system, the gas distribution system including an inlet conduit supplying gas at an inlet pressure and an outlet conduit for delivering gas at a reduced outlet pressure, the main regulator including a main valve controlling gas flow from the inlet conduit to the outlet conduit and thereby also controlling the outlet pressure, a main regulator diaphragm mechanically linked to the main valve and a loading chamber the loading pressure in which acts on the main regulator diaphragm wherein the loading pressure positions the main regulator diaphragm and the main valve, the relay pilot regulator comprising:

(A) a housing defining

(1) an inlet passage connected to the inlet conduit for supplying gas at the inlet pressure,

(2) a load/unload passage intersecting the inlet passage adjacent the end thereof, the load/unload passage connected to the loading chamber of the main regulator, and

(3) an unload passage intersecting the load/unload passage adjacent the end thereof, the unload passage and the inlet passage being generally aligned, and the unload passage connected to the outlet conduit;

(B) an unloading valve slideably mounted in the unload passage and slideable between a first closed position blocking the unload passage and a second open position unblocking the unload passage and thereby connecting the unload passage with the load/unload passage for permitting gas to flow from the loading chamber to the outlet conduit;

(C) a loading valve slideably mounted to the unloading valve in the load/unload passage and extending to the inlet passage and slideable between a first closed position blocking the inlet passage and a second open position unblocking the inlet passage and thereby connecting the inlet passage with the unload/load passage for supplying gas from the inlet conduit to the loading chamber;

(D) a relay pilot regulator diaphragm and means for applying the outlet pressure thereto, wherein the relay pilot diaphragm monitors the outlet pressure and moves in response to changes in the outlet pressure;

(E) a mechanical linkage connecting the relay pilot regulator diaphragm to the loading valve and the unloading valve, the relay pilot regulator diaphragm and the mechanical linkage operating to

(1) open the loading valve when the outlet pressure is below a given desired outlet pressure, thereby supplying gas at the inlet pressure to the loading chamber of the main regulator for acting on the main regulator diaphragm to open the main valve and increase the outlet pressure to the given desired outlet pressure,

(2) close the loading valve when the outlet pressure is at or above the given desired outlet pressure,

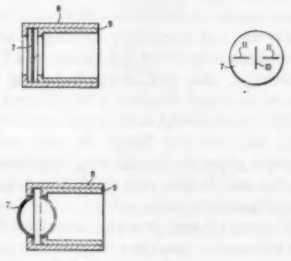
(3) open the unloading valve when the outlet pressure is above the given desired outlet pressure, thereby decreasing the pressure in the loading chamber and causing the main regulator diaphragm to close the main valve and reduce the outlet pressure to the given desired pressure, and

(4) close the unloading valve when the outlet pressure is at or below the given desired outlet pressure.

4,176,678
SAFETY DEVICE FOR VENTING A FUEL TANK

Raymond Marchaix, Paris, and Alain Le Cun, Crespiere, both of France, assignors to Regie Nationale des Usines Renault, Boulogne-Billancoult, France

Filed Dec. 6, 1977, Ser. No. 857,936
Claims priority, application France, Dec. 6, 1976, 76 36642; Jun. 29, 1977, 77 19914; Sep. 16, 1977, 77 28106
Int. Cl.[2] F16K *15/14*
U.S. Cl. 137—493 11 Claims

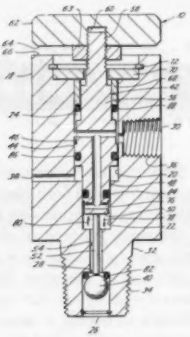


1. A safety device for venting a fuel tank, particularly for automobiles, comprising:

two concentric cylindrical elements having a plurality of flanges and constituting a valve body,

a natural or synthetic hydrocarbon resistant elastomer diaphragm pierced by a plurality of slits and held between the flanges of the two concentric cylindrical elements constituting the valve body, a clearance being provided between the diaphragm and the flanges holding the diaphragm so as to prevent the flanges from causing stresses in the diaphragm capable of deforming the slits and modifying unpredictably gaseous flow through the slits.

4,176,679
CHECK VALVE
Harry Roger, 124 Banks Ave., Lafayette, La. 70506
Filed Mar. 27, 1978, Ser. No. 890,669
Int. Cl.[2] F16K *31/14*
U.S. Cl. 137—495 **6 Claims**



1. A check valve, comprising:

(a) a valve body having:

(i) a bore with first and second sections, the cross sectional area of the first section being smaller than the cross sectional area of the second section,

(ii) an inlet communicating with the first section of said bore for receiving flowing fluid into said valve body,

(iii) a shoulder disposed between the first section of said bore and said inlet for providing a valve seat, and

(iv) an outlet communicating with the second section of said bore for discharging flowing fluid from said valve body;

(b) a valve element mounted within the inlet of said valve body for engaging with the valve seat to shut off fluid flow through said valve body;

(c) a movable piston mounted with said valve body for controlling movement of said valve element, said piston having:

(i) a body portion slidably mounted with the second section of said bore, said body portion having a shoulder facing away from said valve element,

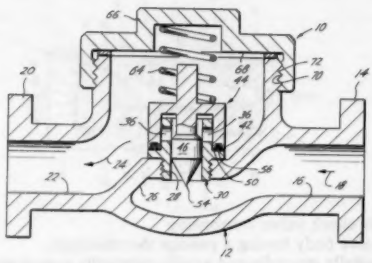
(ii) a male portion extending from said body portion slidably mounted in the first section of said bore, said male portion having a shoulder facing toward said valve element,

(iii) a stem extending from said male portion into the inlet of said valve body, said valve element being mounted with the end of said stem;

(d) a passageway provided in said movable piston for placing the first section of said bore in communication with its second section, an opening force being provided on said movable piston by the pressure from the fluid in the second section on the body portion shoulder, a closing force being provided on said movable piston by the pressure of the incoming fluid acting on said valve element and male portion shoulder; and

(e) said valve element being moved into engagement with the valve seat when the pressure of the incoming fluid is sufficiently great to cause the closing force to override the opening force and thereby check the uncontrolled flow of fluid out of said valve body.

4,176,680
CHECK VALVE
Paul de Launay, 119 W. Farrel, Lafayette, La. 70508
Filed Sep. 30, 1977, Ser. No. 838,148
Int. Cl.[2] F16K *15/02*
U.S. Cl. 137—496 **5 Claims**



1. A check valve used in a fluid flow line, comprising:

A valve body, including

(a) a first portion having

(i) an inlet end for directing the flow of fluid from the flow line through an inlet passageway,

(ii) an outlet end for directing the flow of fluid received from the inlet passageway through an outlet passageway into the fluid flow line,

(iii) a flow channeling shoulder mounted at a junction between the inlet and outlet passageways for directing fluid flow upwardly from the inlet passageway through an opening into the outlet passage,

(b) a second portion having

(i) a tubular section defining a longitudinal passageway with outlet ports extending transversely therefrom, the tubular section being mounted in the opening of the first portion to receive the flowing fluid from the inlet passageway in one end of the longitudinal passageway for fluid flow up the tubular section and out the outlet ports into the outlet passageway,

(ii) a flange extending outwardly from the tubular section at a location below the outlet ports to define an upwardly facing sealing surface, said upwardly facing sealing surface being disposed sufficiently below the outlet ports to inhibit erosion thereof by flowing fluid;

a plunger member mounted within said body, including

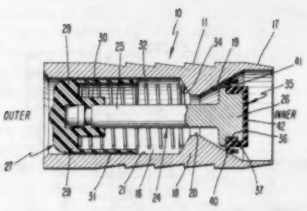
(a) a plug mounted on a lower portion of said plunger member for sliding within the longitudinal passageway of the second portion of said body,

(b) a tubular sleeve mounted with the plunger member and circumscribing the tubular section, said sleeve having a shoulder forming a downwardly facing sealing surface which is engageable with the upwardly facing sealing surface on the flange, the sleeve being moved upwardly by pressure from the fluid in the inlet passageway exerted on the plug; and

a spring mounted within said body urging the downwardly facing sealing surface of said plunger member into engagement with the upwardly facing sealing surface of said body to thereby prevent fluid communication between the inlet and outlet passageways by stopping fluid flow into the outlets ports when the pressure of the fluid within the inlet passageway is insufficient to overcome the force provided by the spring, wherein said plug has a conically shaped lower end with the apex of the cone directed downwardly and the base of the cone being at an elevation which is lower

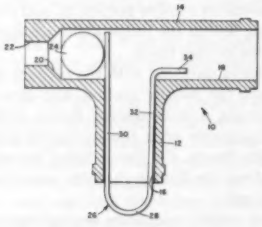
than the downwardly facing sealing surface of said plunger member.

4,176,681
ORAL INFLATION VALVE
Glenn H. Mackal, Buena Vista Dr., Ringwood, N.J. 07456
Filed Sep. 7, 1977, Ser. No. 831,281
Int. Cl.[2] F16K *15/00*
U.S. Cl. 137—516.29 **2 Claims**



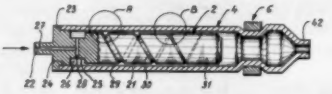
1. A check valve, comprising
a valve body having a passage therethrough,
a radially inwardly and axially outwardly converging annular valve seat surrounding the passage,
a movable valve element having a body,
a sealing member having an annular main body mounted on the body of the valve element, the sealing means selectively cooperating with the valve seat to seal the passage when the valve element is in its valve-closed position,
the sealing member being made of elastomeric material and molded in place on the body of the valve element, under increasing thrusting of the sealing member against the valve seat the first portion of the flange on the sealing member being increasingly deformed to narrow the space between the second portion of the flange and the main part of the sealing member, and
upon the imposition of a predetermined thrust of the sealing member against the valve seat the radially inner surface of the second portion of the flange engages the radially outer surface of the main part of the sealing means.

4,176,682
CHECK VALVE BALL STOP CLIP
William K. Diehl, Waterloo, Iowa, assignor to Deere & Company, Moline, Ill.
Continuation of Ser. No. 675,614, Apr. 9, 1976, abandoned. This application Mar. 20, 1978, Ser. No. 887,959
Int. Cl.[2] F16K *15/04*
U.S. Cl. 137—533.11 **14 Claims**



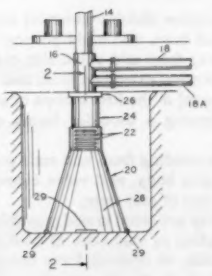
1. In a Tee check valve having a first fluid passage, a second fluid passage intersecting the first fluid passage, a ball valve seat provided in the second fluid passage to one side of the first fluid passage, and a movable ball positioned in the second fluid passage between the seat and first fluid passage, the improvement comprising: an internal stop clip having a generally U-shaped configuration flexible at the base of the U and having an extension at the top of one of the arms of the U extending outwardly from the U in the plane of the U, said stop clip insertable through the first fluid passage of the Tee valve in a compressed condition and expandable to be self-retaining at the intersection of the first and second fluid passages of the Tee check valve with the other one of the arms extending into the second fluid passage so as to retain the ball in the second fluid passage between the seat and first fluid passage.

4,176,683
FLOW REGULATOR
Saul H. Leibinsohn, Rishon-Le-Zion, Israel, assignor to Koninklijke Emballage Industrie Van Leer B. V., Amstelveen, Netherlands
Filed Oct. 4, 1977, Ser. No. 839,303
Claims priority, application Netherlands, Oct. 8, 1976, 7611187; Aug. 17, 1977, 7709108
Int. Cl.[2] F16K *7/04, 47/12*
U.S. Cl. 137—559 **18 Claims**



1. A presettable flow-regulator connectable between two fluid-carrying tubes, comprising: a core connectable at one end to one fluid tube and having a passageway for conducting the fluid therefrom to the outer surface of the core; a flexible sleeve having an open end receivable over said core and connectable at its opposite end to the other fluid tube; said core having an outer diameter slightly smaller than the inner diameter of the flexible sleeve and having a recess of varying cross-section formed in its outer surface and progressing axially of the core; and a ring having an inner diameter slightly smaller than the outer diameter of the flexible sleeve and receivable thereover, said ring being presettable along the length of the flexible sleeve to press the underlying portion thereof against the core at a selected cross-section of said recess to thereby regulate the flow of the fluid between the core and the flexible sleeve from one tube to the other.

4,176,684
SPLASH DOWN
Richard C. Kelso, and Eileen E. Kelso, both of 588 Summerdale Ave., Glen Ellyn, Ill. 60137
Filed Oct. 26, 1977, Ser. No. 845,486
Int. Cl.[2] E03C *1/00*
U.S. Cl. 137—562 **2 Claims**



1. In combination, a filling and draining attachment joined to a water using appliance, a water faucet spaced above a sink equipped with a lower drain, said attachment connected to the faucet includes a downward vertical discharge outlet, a fluid discharge device comprising:

a round hollow truncated cone-shaped body with a tubular structure at the top of the truncated cone,

a movable adjustment tube inserted into the tubular structure portion of the body and extends upward from the body of the device,

said adjustment tube having a series of male shoulder graduations extending around the outside diameter and held by a matching series of female indentations extending around the inside diameter of the tubular structure portion of the body,

said vertical discharge outlet of the faucet attachment is inserted into the top of the adjustment tube and the height of the fluid discharge device is adjusted so that the base of the device rests on the bottom of the sink and encircles the sink drain,

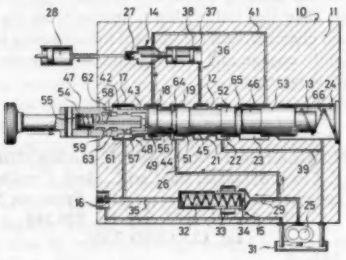
said base of fluid discharge device having magnets embedded into the base of the round truncated cone shaped body to hold the device in use to the bottom of the sink.

4,176,685

VALVE ARRANGEMENT FOR CONTROLLING THE FLOW OF HYDRAULIC FLUID TO AND FROM A USER

Friedrich-Wilhelm Höefer, Ditzingen; Walter Gerschwitz, Moensheim, and Güenther Schwerin, Moeglingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Feb. 9, 1978, Ser. No. 876,216
Int. Cl.² F15B *13/04*
U.S. Cl. 137—596.13 **8 Claims**



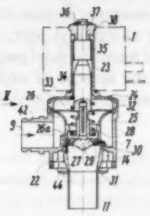
1. In an arrangement for controlling the flow of a hydraulic fluid between a fluid reservoir, a pump and a user, which arrangement is of the type including a main control slide that controls the communication with the fluid reservoir of a pressure chamber which communicates the pump with the user through an input chamber, and that forms an adjustable throttle which influences the operation of a flow-regulating valve which is arranged in parallel to the main control slide between the pump and the fluid reservoir, the arrangement further including a control conduit communicating the flow-regulating valve with a switching chamber the communication of which with the fluid reservoir is controlled by the main control slide, the improvement wherein a control chamber is arranged at the main control slide between the switching chamber and the input chamber, and the main control slide has a control land which interrupts the communication of the switching chamber with the control chamber when the adjustable throttle is fully open; and wherein the adjustable throttle is so arranged as to influence the flow of the hydraulic fluid between the input chamber and the control chamber.

4,176,686

FLOW CONTROL VALVE FOR LIQUIDS

Kurt Stähle, Neuhausen-Steinegg, Fed. Rep. of Germany, assignor to Concordia Fluidtechnik GmbH, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 890,309, Mar. 27, 1978. This application Nov. 20, 1978, Ser. No. 961,927
Claims priority, application Fed. Rep. of Germany, Nov. 19, 1977, 2751775
Int. Cl.² F16K *19/00*
U.S. Cl. 137—604 **17 Claims**



1. Flow control valve for liquids, such as water or the like heated to near the boiling point; comprising:

a sealing body,

a valve seat which cooperates with the sealing body to form a throttling point,

ventilating aperture means opening into the flow of liquid through said valve at a position downstream of the throttling point,

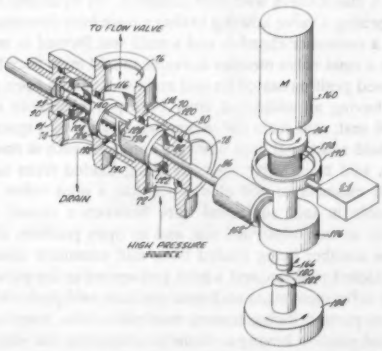
said sealing body being formed as a closure element with an elastically yielding tapered part, said valve seat being formed as a relatively thin seating plate that extends inwardly from said aperture means and includes an inner edge which cooperates with the tapered part.

4,176,687

HOLLOW SPOOL VALVE

Harold W. Ensign, Fullerton, Calif., assignor to Cla-Val Co., Costa Mesa, Calif.

Filed Aug. 25, 1977, Ser. No. 827,628
Int. Cl.² F15B *13/044*; F16K *31/04*
U.S. Cl. 137—625.65 **23 Claims**



1. A three-way valve comprising

a valve body having first and second mutually spaced chambers, said chambers respectively having first and second external ports for fluid communication with points outside of the valve body, and respectively having first and second internal ports,

a valve seat in each said chamber,

a hollow spool having first and second ends extending into said first and second chambers through said first and second internal ports respectively, said spool being axially slidable in said valve body from a first position wherein said first end of the spool is relatively closer to said seat of said first chamber and said second end of said spool is relatively further from said seat of said second chamber, and a second position in which said first end of the spool is relatively further from said first seat of the first chamber and said second end of the spool is relatively closer to said second seat of said second chamber,

said valve body having a third chamber formed therein adjacent an intermediate portion of said spool, said third chamber having an external port, said intermediate portion of said spool including port means for fluid communication between the interior of said spool and said third chamber, and means for axially shifting said spool.

4,176,688

CHECK VALVE

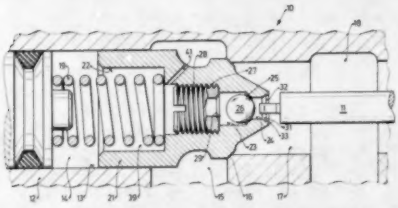
Günther Schwerin, Möglingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jan. 20, 1978, Ser. No. 871,109

Claims priority, application Fed. Rep. of Germany, Feb. 9, 1977, 2705303

Int. Cl.[2] F16K *31/385*

U.S. Cl. 137—630.13 **12 Claims**



1. A check valve with pilot actuation, for hydraulic systems, comprising a valve housing having a main bore communicating with a consumer chamber and a main seat formed in said main bore; a main valve member movable in said main bore between a closed position seated on said main seat and an open position and having an additional inner bore provided with an additional seat, said main valve member having two spaced ends and said additional bore having a conical mouth at one of said ends, said main valve member being loaded from said consumer chamber to said closed position; a pilot valve member movable in said additional bore between a closed position seated on said additional seat and an open position, said pilot valve member being loaded from said consumer chamber to said closed position; and a push rod operative for moving said pilot valve member to said open position, said push rod having a first portion facing toward said pilot valve member and a second portion having a diameter exceeding the diameter of said first portion, said first portion and said second portion forming a shoulder, said push rod having intermediate said first and second portions a conical transitional portion complementary to said conical mouth, said push rod furthermore having pressure-relief clearances in the region of said transitional portion and shoulder so located that when said transitional conical portion is seated on said conical mouth fluid in said additional bore can pass through said clearances.

4,176,689

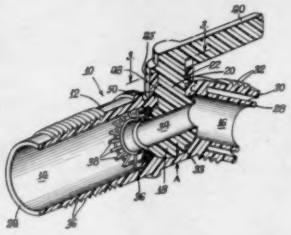
FLUID CONTROL VALVE WITH STEM SEAL

Thomas J. Wrasman, 11222 Bluegrass Pkwy., Louisville, Ky. 40299

Filed Oct. 5, 1977, Ser. No. 839,441

Int. Cl.[2] F16K *5/06, 41/00*

U.S. Cl. 137—797 **11 Claims**



1. A fluid control valve comprising housing means having walls defining an inlet, an outlet and a chamber communicating therebetween, a valve plug disposed within said chamber for regulating the flow of fluid between the inlet and outlet, said valve plug having a passageway therethrough, a valve stem rigidly attached to said valve plug and extending through said housing means for exteriorly rotating said valve plug between an open position in which said passageway flowably communicates with the inlet and outlet and a closed position in which said valve plug blocks any flow between the inlet and outlet, said valve plug being spaced from the adjacent wall of said chamber and having an effective fluid pressure responsive surface providing a net upward force in the direction of said valve stem whenever fluid is present between plug and adjacent housing, said valve stem including a peripheral shoulder interior of said housing means and spaced from said housing means less than said valve plug is spaced from the adjacent wall of said chamber, said net upward force causing said shoulder to tightly engage said housing means, preventing leakage along said valve stem.

4,176,690

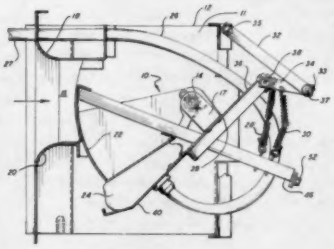
REGULATOR FOR A DAMPER ASSEMBLY

William E. Clark, Syracuse, and Carl C. Herb, Camillus, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Dec. 7, 1977, Ser. No. 858,141

Int. Cl.[2] G05D *7/01*

U.S. Cl. 137—8 **13 Claims**



12. A method of regulating the operation of a damper assembly employed to control the flow of conditioned air through a supply duct comprising the steps of:

providing a signal indicative of the conditioned air supply pressure to control the position of the damper assembly within the supply duct to maintain a substantially constant

volume air flow irrespective of changes in the supply air pressure;

generating a first force at the maximum constant volume flow setting to restrain movement of the damper blade assembly as the position thereof is changed in response to an increase in the supply air pressure; and

generating a second force at reduced levels of constant volume flow settings, with said first and second forces being additive to further restrain movement of the damper blade assembly.

4,176,691

APPARATUS FOR ARRESTING PROPAGATING FRACTURES IN PIPELINES

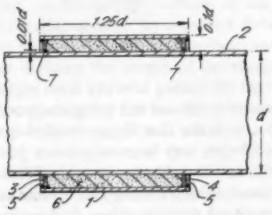
Dennis W. Jude, Corbridge, and Joseph S. Bell, Blyth, both of England, assignors to British Gas Corporation, London, England

Continuation of Ser. No. 646,542, Jan. 5, 1976, abandoned. This application Apr. 17, 1978, Ser. No. 897,127

Claims priority, application United Kingdom, Jan. 22, 1975, 2722/75

Int. Cl.[2] F16L *57/00*

U.S. Cl. 138—103 **1 Claim**



1. In combination, a pipeline and a pipeline fracture-arresting means for arresting fractures in said pipeline, said fracture-arresting means comprising: a single cylindrical sleeve of greater diameter than the pipeline and positioned substantially concentrically around a continuous region of the pipeline so as to define an annular space therebetween, and an annular support means for bridging said annular space, said annular support means comprising a filling of a material having a high compressive strength and being bonded to the internal surface of the sleeve and the external surface of the pipeline, respectively, and two inwardly extending annular plates fixed one at each end of the sleeve, each annular plate having an inside diameter slightly greater than the outside diameter of the pipeline so that the innermost edge thereof is spaced from the external surface of the pipeline.

4,176,692

ROTATING DRIVING MECHANISM FOR IMPARTING RECIPROCATORY MOTION TO A DRIVEN ELEMENT

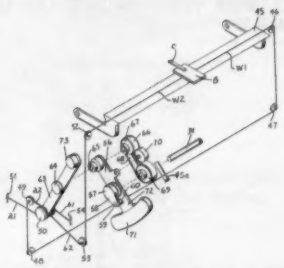
James W. Simmons, Jr., Atlanta, Ga., assignor to Cox Foundry & Machine Co., Atlanta, Ga.

Filed Aug. 21, 1978, Ser. No. 935,362

Int. Cl.[2] D03D *39/18*

U.S. Cl. 139—21 **3 Claims**

1. A rotatable driving mechanism for impartingreciprocatory movement to a driven member (C), said mechanism comprising a rotatable drive shaft (**34**), a drive arm (**56**) mounted on and rotatable with said drive shaft (**34**) and having a swing end projecting radially therefrom, a drive link (**63**) oscillatably mounted on the swing end of said drive arm and having a swing end arranged to oscillate in a plane parallel to the plane of rotation of said drive arm and about a center of oscillation (**64**) which is movable with said drive arm, means (**66–70**) for imparting oscillation to said drive link (**63**) which is in synchronism with rotation of said drive arm (**56**) and wherein the improvement comprises counterbalance means (**71,72**) projecting from said drive arm (**56**) and rotatable therewith about said drive shaft (**34**) and arranged to counterbalance the total weight of said drive arm (**56**) and of said drive link (**63**) irrespective of the angular position of said drive link (**63**) relative



to said drive arm (**56**), and drive link balance means (**73**) projecting from said drive link (**63**) and disposed in alignment therewith so as effectively to counterbalance said drive link for oscillation about its center of oscillation (**64**).

4,176,693

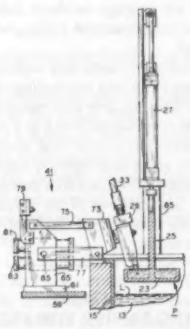
APPARATUS AND METHOD OF OPERATING

Jesse A. Stoner, Scotia, N.Y., and Robert L. Mills, Fort Wayne, Ind., assignors to General Electric Company, Fort Wayne, Ind.

Filed Mar. 6, 1978, Ser. No. 883,582

Int. Cl.[2] B65B *3/04;* **B22D** *41/00*

U.S. Cl. 141—1 **58 Claims**



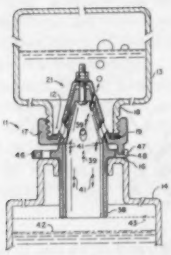
13. An apparatus comprising means for containing a level of flowable hardenable material therein, means operable for only carrying a part of the hardenable material at least from the level thereof in said containing means to a preselected position beyond the level of the remaining hardenable material in said containing means so that the entire hardenable material part is contained in said carrying means when it is in its preselected position, and means associated with the entire hardenable material part contained in said carrying means when it is in its preselected position for extracting at least some of the hardenable material from the entire part thereof contained in said carrying means.

4,176,694

AUTOMATIC SHUTOFF LIQUID DISPENSING VALVE

Delbert J. Dickerson, Inglewood, Calif., assignor to Donald R. Dickerson, Gig Harbor, Wash.

Filed Mar. 27, 1978, Ser. No. 890,255
Int. Cl.[2] B65B *3/26, 57/04;* **B67D** *5/06;* **G01F** *23/00*
U.S. Cl. 141—95 **10 Claims**



1. An automatic shutoff liquid dispensing valve for controlling the flow of liquid from a container into a receptacle comprising:

A. a cap portion to be secured hermetically on the mouth of a liquid container from which liquid is to be dispensed;

B. a stud portion projecting axially from said cap portion to be positioned interiorly of said container when said cap portion is secured on its mouth;

C. at least two passages extending through said stud portion;

(1) one of said passages being a liquid passage for the flow of liquid from said container and the other of said passages being an air passage for the flow of air into said container to permit liquid to flow therefrom;

(2) said passages communicating the interior of said container with a common passageway extending through said cap portion and through which air and liquid flow in opposite directions to audibly interact with one another when liquid is being dispensed from said container; and

(3) said air passage communicating with said common passageway further from said cap portion than said liquid passage whereby air in said common passageway enters said air passage without interference by liquid flowing into said common passageway from said liquid passage; and

D. a conduit portion hermetically communicating with said common passageway and projecting outwardly from said cap portion to have its free end immersed by liquid within said receptacle upon liquid being at a predetermined depth therewithin, said free end of said conduit having an inlet for air into the same and thereby into said common passageway whereby upon said free end of said conduit being immersed by liquid, flow of air through said air inlet is terminated with consequent termination of flow of liquid from said container.

4,176,695

LEVER HOLDING DEVICE FOR FUEL DISPENSING NOZZLE ASSEMBLY

Walter O. A. Raske, 9051 Katy Freeway, Houston, Tex. 77024

Filed Jul. 26, 1978, Ser. No. 928,087
Int. Cl.[2] B65B *3/04;* **G05G** *5/06*
U.S. Cl. 141—96 **3 Claims**

1. For use in dispensing fuel into a tank from a nozzle assembly through a flexible hose leading from an upright pump body, wherein

the nozzle assembly includes

a spout for insertion into the inlet of the tank,

a handle having a flowway therethrough to connect the hose with the spout and a valve for regulating the flow of fuel through the passageway,

a lever mounted beneath the handle in position to be lifted in order to move the valve from closed position to open position, and

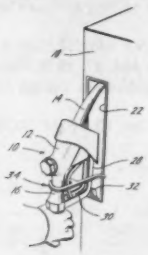
a guard mounted on the handle having a lower portion extending beneath the lever to prevent its accidental displacement, and wherein

the pump body has means thereon to support the nozzle assembly therefrom with the lower portion of the guard adjacent the side of the pump body when the assembly is not in use;

a device for releasably holding the lever in its upper position, comprising

a longitudinally extending base,

a first finger projecting laterally from one side of the base near one end thereof to permit it to be hooked over the top side of the handle, and



a second finger projecting laterally from said one side of the base intermediate its end and being so spaced from the first finger that, with the first finger hooked over the handle, the second finger may be swung into a position in which it is beneath and in tight engagement with the raised lever,

said base extending downwardly along one side of and past the lower guard portion, when said second finger is so positioned, so as to dispose its other end in position to engage the side of the pump body as the assembly is being moved into supported position on the pump body, whereby

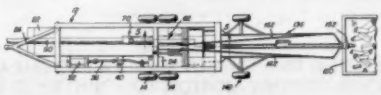
the user of the device is alerted to the fact that said device has not been removed from the assembly.

4,176,696

FIREPLACE WOOD CUTTING MACHINE

Carroll D. Greeninger, Portland, Oreg., assignor to Bunyan's Woodcutter Corp., Portland, Oreg.

Continuation-in-part of Ser. No. 706,290, Jul. 19, 1976, Pat. No. 4,076,061. This application Jan. 23, 1978, Ser. No. 871,160
Int. Cl.[2] A47J *42/09;* **B27L** *7/00*
U.S. Cl. 144—3 K **23 Claims**



1. A wood cutting machine comprising:

(a) an elongate support frame;

(b) transport means mounted on said frame for conveying logs placed thereon along said support frame;

(c) shear means, comprising a reciprocal blade having a sharpened edge, mounted on said support frame adjacent to said transport means for cutting log end portions being discharged from the said transport means;

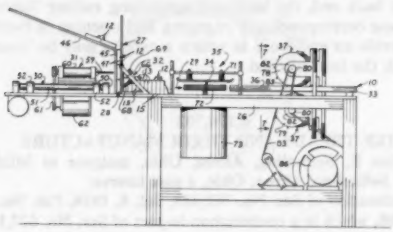
(d) cradle means located on said support means for cooperating with said blade by supporting said log against the movement of said blade when said blade is cutting said log end portions; and

(e) splitting means mounted on said frame adjacent to said shear means for splitting said sheared end portions into multiple log sections.

4,176,697
MACHINE FOR MAKING WOODEN BEE BOX COMPONENTS

John W. Strauser, P.O. Box 991, Walla Walla, Wash. 99362

Filed Dec. 12, 1977, Ser. No. 859,811
Int. Cl.[2] B27C *1/08, 5/00, 3/04*
U.S. Cl. 144—7 6 Claims



1. An automatic woodworking machine for forming bee box components from elongated wooden stock members, each stock member including: (a) face surfaces spaced apart a first distance defining the thickness dimension of the member; (b) side edge surfaces spaced apart by a second distance defining the width of the member; (c) end edge surfaces spaced apart by a third distance defining the length of the member; said machine comprising:

feed means for positioning the wooden stock members with their facing surfaces upright and transverse to an intended direction of movement and for delivering successive members oriented in this condition to an infeed station;

indexing means cooperating with the feed means for receiving successive stock members from the feed means at the infeed station and for incrementally moving them in the intended direction of travel in a row with the face surface of one stock member engaging a face surface of the immediately preceding stock member;

drill means operated in conjunction with the indexing means for drilling holes through each stock member from one face surface to the other;

first milling means at a first cutting station for milling end grooves in the end edge surfaces between face surfaces as the members progressively move past the first station;

spaced, elongated, end groove guide bars complementary to the dimensions of the end grooves and extending past a second cutting station for riding in the end grooves to guide and support the members by their ends as the members are progressively moved forward past the second station; and

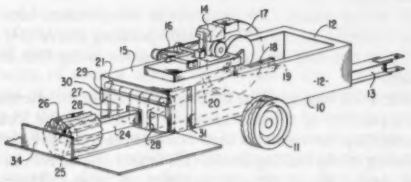
second milling means at the second cutting station for milling a side groove in at least one of the side edge surfaces of each member as the member is moved past the second cutting station supported at its end by the groove guide bars.

4,176,698
FIREWOOD SPLITTING DEVICE

Christ L. Ahlschlager, Minneota, Minn. 56264; Marvin L. Ahlschlager, Iona, Minn. 56141, and Donald A. Ahlschlager, Balaton, Minn. 56115

Filed Jun. 9, 1978, Ser. No. 914,670
Int. Cl.[2] B27L *7/00*
U.S. Cl. 144—193 R 3 Claims

1. A device for splitting logs comprising platform means on which a log may be held, sidewalls mounted vertically on each lateral side of said platform, plate means slidably disposed on said platform between said walls, crank means rotatably mounted above said platform, pitman means operably connecting said crank means and said plate means, power means including a large flywheel on said crank means adapted to drive said plate means, ram means mounted on said plate means on a

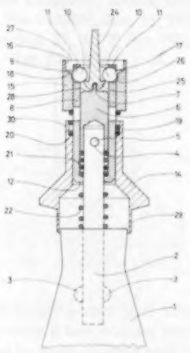


face opposite said crank means, and a stripper plate mounted between said walls and adjacent said ram means.

4,176,699
CHUCK FOR GRIPPING HEAD OF SCREW

Kajetan Leitner, Am Winacker, 8170 Bad Tölz, Fed. Rep. of Germany

Filed Jan. 18, 1978, Ser. No. 870,517
Claims priority, application United Kingdom, Feb. 15, 1977, 6193/77
Int. Cl.[2] B25B *23/10*
U.S. Cl. 145—52 4 Claims



1. A chuck for gripping the head of a screw (24) during rotation comprising

a driving head (6) having an end (7) adapted to engage and impart rotation to the screw (24),

a shank (2) having a forward end operatively connected to said head (6) for rotating the same,

a carrier sleeve (8) slidably mounted lengthwise on said driving head (6) and on said shank (2),

an operating sleeve (14) mounted on a rearward end of said carrier sleeve (8),

first spring means (21) mounted in compression between said driving head (6) and said carrier sleeve (8) and urging said carrier sleeve (8) to an intermediate position in which an end of said carrier sleeve (8) is substantially level with the end (7) of said head (6),

second spring means (22) carried by said shank (2) and loading said carrier sleeve (8) toward the end (7) of said head (6),

a circumferentially arranged series of radial bores (9) located in said carrier sleeve (8) adjacent its forward end,

a series of locking balls (10) received and radially displaceable in the series of bores (9),

a locking sleeve (13) slidably disposed on said carrier sleeve (8),

said locking sleeve (15) having internal cam surfaces (16, 17 and 18) to engage the urge the locking balls (10) inwards upon sliding of the locking sleeve (15) in a first direction to a forward end (11) of said carrier sleeve (8), and to

release the locking balls (10) for outward displacement upon sliding of the locking sleeve (15) in an opposite direction,

third spring means (19) mounted in compression between said locking sleeve (15) and said operating sleeve (14) and urging said locking sleeve (15) to move in the first direction,

said head (6) engaging the locking balls (10) in the intermediate position of the carrier sleeve (8) to hold the locking balls (10) outwardly in their bores (9) thereby preventing sliding of the locking sleeve (15) in said one direction, and

said carrier sleeve (8) and said locking sleeve (15) being movable together in said one direction to carry the locking balls (10) beyond the end (28) of the head (6) thereby freeing the locking sleeve (15) for movement in the one direction on the carrier sleeve (8).

4,176,700

FLEXIBLE TUBULAR CASING ARTICLE

Mark F. Mettler, Lombard; Clifford C. Faust, Riverside; Brant A. Loichinger, Orland Park, and Walter T. Forrest, Chicago, all of Ill., assignors to Union Carbide Corporation, New York, N.Y.

Filed Jul. 21, 1977, Ser. No. 817,690
Int. Cl.[2] A45C *13/00*
U.S. Cl. 150—3 **15 Claims**

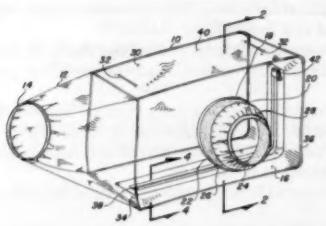
1. A flexible tubular food casing article having an end closure comprising a base portion and a series of triangular flaps extending from said base portion, each of said triangular flaps having a common vertex and being folded over a portion of an adjacent flap, and anchor means for anchoring said flaps against at least a part of said base portion including a connection between said flaps and said base portion, said end closure defines a curved surface.

4,176,701

CAMERA RAIN SHIELD

Peter R. Welgan, 1141 La Mirada, Laguna Beach, Calif. 92651

Filed Sep. 28, 1978, Ser. No. 946,664
Int. Cl.[2] G03B *17/56*
U.S. Cl. 150—52 J **7 Claims**



1. A protective shield for a camera comprising:

an optically transparent body with a bottom, elongated right side containing a opening, a left side, a back and a front with an opening;

an elastic contraction band on the periphery of said opening on said elongated right side to tightly engage one's wrist and inserting one's hand therein;

fastening means on said opening in said front continuing essentially around the periphery of the opening; and

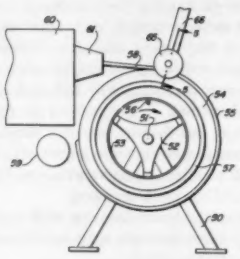
a radial opening extension in the form of a tube with a front and back end, the back end containing mating fastening means correspondingly engaging said opening in front to provide an enclosure in which a camera may be inserted with the lens exposed.

4,176,702

TIRE TREADS AND THEIR MANUFACTURE

Theophilus K. Seiberling, Akron, Ohio, assignor to Mildred Kelly Seiberling, Akron, Ohio, a part interest

Continuation of Ser. No. 702,623, Jul. 6, 1976, Pat. No. 4,139,405, which is a continuation-in-part of Ser. No. 627,136, Oct. 30, 1975, which is a continuation of Ser. No. 395,346, Sep. 7, 1973, Pat. No. 3,933,553, which is a continuation of Ser. No. 321,421, Jan. 5, 1973, abandoned, which is a continuation-in-part of Ser. No. 838,512, Jul. 2, 1969, abandoned. This application Mar. 7, 1977, Ser. No. 774,809
The portion of the term of this patent subsequent to Jan. 20, 1993, has been disclaimed.
Int. Cl.[2] B60C *11/00*
U.S. Cl. 152—209 R **50 Claims**



1. The process of preparing a tire tread stock which includes rubber which is curable by electron irradiation, which process comprises treating and thereby at least partially curing at least a portion of said tire tread stock by exposure to electron irradiation or other means of radiation having the same curing effect on the exposed rubber, before the at least partially uncured tire with said treated tread stock assembled thereon is placed in a mold for the final cure of the tire.

4,176,703

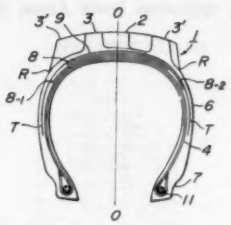
PNEUMATIC TIRE HAVING LUG PATTERN

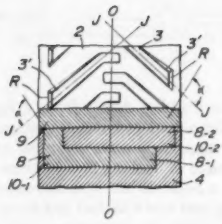
Hiroshi Nojima, and Masahiro Nishimura, both of Kodaira, Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed May 26, 1977, Ser. No. 800,840
Claims priority, application Japan, Jun. 9, 1976, 51-66487
Int. Cl.[2] B60C *11/00, 11/06*
U.S. Cl. 152—209 B **6 Claims**

1. A pneumatic tire having a lug pattern comprising a pair of bead portions, sidewalls joined to said bead portions, a carcass extending from one bead portion to the other, a breaker composed of at least two plies arranged by cords parallel to one another in each ply and disposed between said carcass and a tread portion, tread portion being disposed between said sidewalls and having a lug pattern composed of lugs spaced apart from each other in the circumferential direction of the tire and symmetrically disposed along two directions crossed with each other with respect to the equatorial plane of the tire, the improvement comprising; a textile cord cover layer superim-

posed around said breaker, said cover layer having side ends extending to each of the side walls, each ply of the breaker having an offset projected from the equatorial plane of the tire so that outer regions of one of the breaker plies and said lugs face each other, the cords of said breaker plies being continuous and being arranged along two directions crossed through said cover layer at an angle of a range between 50° and 130° with respect to the axial direction of said lug, and the outer ends of each of said breaker plies terminating within said sidewalls above said bead portions outside the region of said tread portion.



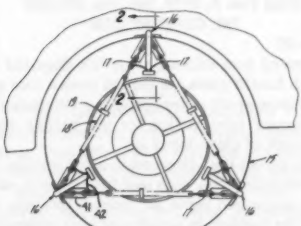


4,176,704

EMERGENCY TRACTION DEVICE

Walter H. Thorpe, 9403 Somerset, Detroit, Mich. 48224

Filed Jan. 24, 1977, Ser. No. 761,593
Int. Cl.[2] B60C *27/00, 27/02*
U.S. Cl. 152—225 C **18 Claims**



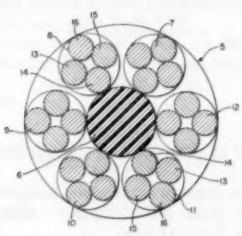
1. An emergency traction device for use on tires and the like having inner and outer sidewalls and including at least three clamp bar assemblies interconnected by suitable connecting means of substantially equal length, wherein each of said clamp bar assemblies has an inwardly and an outwardly extending portion and a pivot point, with said suitable connecting means being connected to said clamp bar assemblies at said pivot point, said pivot point being located near the center of gravity of each of said clamp bar assemblies, on the outwardly extending portion thereof, between the center of gravity and the beginning of the inwardly extending portion of the clamp bar assembly, wherein said inwardly and said outwardly extending portion of the clamp bar assembly both having a straight portion substantially coextensive with the thread of said tire and a curvilinear portion extending radially inwardly of the tire and adapted to contact and exert a pressure on the respective side wall of said tire to grip it while at rest, said curvilinear portion of said outwardly extending portion of each clamp bar assembly being of such a degree of curvature that the center of gravity of the clamp bar assembly will substantially act normally to the tire tread, with said inwardly extending portions of each clamp bar assembly thus being of a configuration such that the mass of the outwardly extending portion of each clamp bar assembly shall be substantially greater than that of the inwardly extending portion of the clamp bar assembly so that the resultant centrifugal force produced during the tire rotation and acting through the center of gravity of the clamp bar assembly located on said outwardly extending portion thereof will produce a moment about said pivot point which causes the inwardly extending straight portion to contact and exert a pressure against the tread of said tire when said tire is in a rotating motion.

4,176,705

TIRE CORD WITH A SYNTHETIC FIBER CORE

C. Paul Russell; Joseph M. Gingo, both of Akron, and Oswald A. Drica-Minieris, Canton, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 649,899, Jan. 16, 1976, abandoned. This application Sep. 15, 1977, Ser. No. 833,466
Int. Cl.[2] B60C *9/00*
U.S. Cl. 152—359 **7 Claims**



1. A composite cord for a tire having a body of corrosion-resistant material, comprising a plurality of metal strands having equal diameters and tensile strengths and a centrally disposed unreinforced non-metallic core having a generally circular cross section around which said strands are cabled, said core having a diameter at least equal to the diameter of each of said metal strands and sufficient to hold said metal strands in a spread condition so that said corrosion-resistant material covers and adheres to said strands to prevent exposure of said metal strands to moisture, and said core having a tensile strength substantially equal to the tensile strength of any one of said metal strands so as to maintain said strands in said spread condition under tension and carry a proportional amount of the load imparted to said strands and said core.

4,176,706

APPARATUS AND METHOD FOR MAKING BRIDGEWORK

Larry C. Been, 4335 Bonham, Dallas, Tex. 75229

Filed Jun. 29, 1977, Ser. No. 811,427
Int. Cl.[2] B22C *9/04;* A61C *13/22*
U.S. Cl. 164—34 **3 Claims**

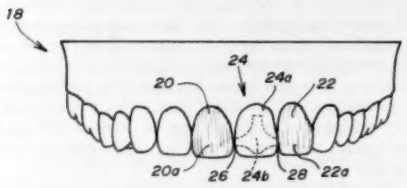
1. A method of making a frame for a dental bridge utilizing a die which is a pattern of a patient's teeth including a gap formed between two abutment teeth, which comprises the steps of:

forming a temporary crown pattern on each abutment tooth

of the die of a material capable of being dissipated at a temperature below the vaporizing temperatures of metals,

inserting between said crown patterns a tooth-shaped facing member having a groove on the lingual side which extends between the contact areas thereof, said groove containing a temporary removable rigid insert formed of a material capable of being dissipated at a temperature less than the vaporizing of metals,

joining the ends of said insert to the sides of said crown patterns,



removing said facing member from said insert,

removing said crown patterns and said insert as a unit from said die,

forming a hollow cast by surrounding said unit with casting plaster and dissipating said unit by heating to a temperature below the vaporizing temperature of metals, and

casting a metal frame for a dental bridge from said hollow cast.

4,176,707

METHOD OF CONTINUOUSLY CASTING A STEEL STRAND

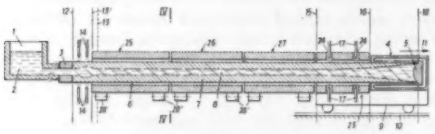
Eduard Michaelis, Seewalchen, Austria, assignor to Vereinigte Österreichische Eisen- und Stahlwerke - Alpine Montan Aktiengesellschaft, Linz, Austria

Filed Aug. 11, 1977, Ser. No. 823,669

Claims priority, application Austria, Aug. 20, 1976, 6184/76

Int. Cl.[2] B22D *11/00*

U.S. Cl. 164—89 **8 Claims**



1. In a method of continuously casting a steel strand by using a mould having a closed bottom, the cast strand having a longitudinal extension exceeding that of the mould, said method including the steps of introducing molten steel from a casting container into said mould, moving said mould away from said casting container along a substantially horizontal path for forming the steel strand with a solidified strand skin and a liquid core, and pouring further molten steel through said solidified strand skin in the direction toward the bottom of the mould, the improvement comprising the step of supplying heat to at least a portion of the strand located outside of said mould between the mould and the casting container so as to cause the liquid core in that portion of said strand to have a uniform temperature, said heat being sufficient to keep said core temperature above the liquidus temperature of the steel over most of the longitudinal extension of the cast strand.

4,176,708

FLUSHING OF LIQUID CIRCULATION SYSTEMS

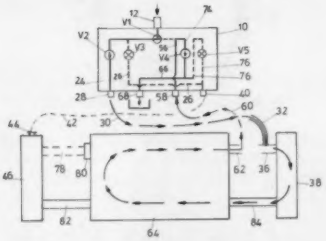
Kenneth L. Joffe, Warner Beach, South Africa, assignor to Wynn Oil Company, Fullerton, Calif.

Division of Ser. No. 727,143, Sep. 27, 1976, Pat. No. 4,127,160. This application Sep. 13, 1978, Ser. No. 942,135

Claims priority, application South Africa, Sep. 30, 1975, 75/6215

Int. Cl.[2] F28G *9/00*

U.S. Cl. 165—95 **10 Claims**



1. Apparatus for flushing debris from a liquid circulation system that includes a heat-generating unit and two heat-dissipating units, the apparatus comprising an inlet conduit for connection to a source of flushing liquid, a first branch conduit for attachment to a point on the system communicating with the heat-generating unit and a second and third branch conduit for attachment to points on the system each communicating with a heat-dissipating unit, and a drainage conduit; and valve means interconnecting such conduits and settable between at least three positions in each of which a flushing liquid is adapted to pass through the inlet conduit and one of the branch conduits and, after traversing a flow path in the system, reenter the apparatus through another branch conduit and finally leave the apparatus through the drainage conduit, the flow paths differing for different settings of the valve means, and including at least one flow path in which the liquid is adapted to pass through at least two of the units of the system.

4,176,709

STACK-TYPE HEAT EXCHANGER

Willard L. Johnson, 12923 Lincoln Ave., Huntington Woods, Mich. 48070

Filed Feb. 6, 1978, Ser. No. 875,380

Int. Cl.[2] F28F *7/00*

U.S. Cl. 165—99 **10 Claims**

1. An improved heat exchanger device disposed in a stack through which heated gases are vented from a heat generating source, the improvement comprising in combination

a heat exchanger tube section for the heating and passage therethrough of clean input air,

a motor driven fan unit disposed in a fan section connected to and communicating with said tube section, said fan unit drawing said clean input air from a location outside or inside of the building in which said heat generating source is located and forcing said air into and through said tube section,

and coupling and transition members conjoining said tube section to and for communication with stack portions thereabove and therebelow,

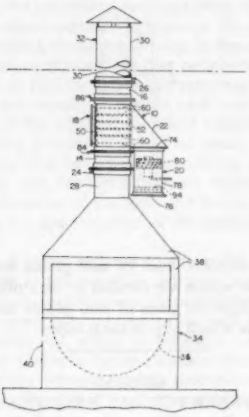
said tube section comprising a housing for and a plurality of spaced apart clean air conducting tubes disposed therein transversely of the flow direction of the vented stack gases,

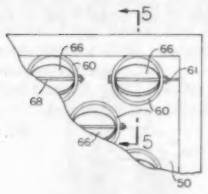
said housing defining a chamber therein for said stack gases to pass therethrough and over and about said tubes therein to heat said tubes and the clean air passing therethrough,

said tubes communicating at their input ends with said fan section to receive said clean air therefrom and conducting

said air through said tube section housing to the output ends of said tubes for discharge of heated clean air from said tube section,

said tubes each having a damper plate attached thereto at its output end to modify and restrict the output orifice of said





tube so as to generate a positive air pressure in each of said tubes at a valve above and in excess of the static pressure of said vented stack gases passing through said chamber, whereby to prevent said vented stack gases from entering said clean air conducting tubes.

4,176,710

FLUIDIZED BED REACTOR

Jost Gansauge, Burghausen; Johann Muschi, Munich, and Hans Freudlsperger, Neuötting, all of Fed. Rep. of Germany, assignors to Wacker-Chemie GmbH, Munich, Fed. Rep. of Germany

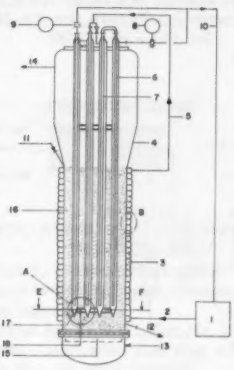
Filed Feb. 1, 1978, Ser. No. 874,185

Claims priority, application Fed. Rep. of Germany, Feb. 7, 1977, 2704975

Int. Cl.[2] F28C *3/16*

U.S. Cl. 165—104 F **7 Claims**

1. A fluidized bed reactor for the preparation of silicon-halogen compounds from the reaction of a silicon containing contact mass with organic halides, said fluidized bed reactor containing a heat exchange apparatus for conveying a heat transfer medium, said heat exchange apparatus having at least one pipe which is suspended vertically from the top of said reactor into the fluidized bed, said pipe having a conically tapered configuration at its end which is opposite to the direction of gas flow in which the inside of said conically tapered section of the pipe is solid, a jacket on the outside wall of said fluidized bed reactor which forms a serpentine conduit having a rectangular cross section which is enclosed on its outer most surface with a cover having a dome-shaped configuration, said



jacket is connected to the pipe so that the heat transfer medium is conveyed through said jacket into said pipe.

4,176,711

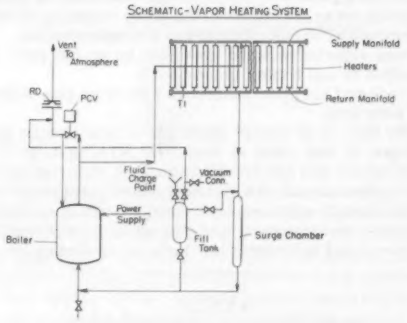
YARN HEATING APPARATUS AND PROCESS

Lee H. Knox, Charlotte, N.C.; Malcolm P. Owens, Lake Charles, La., and George R. Ure, Charlotte, N.C., assignors to Fiber Industries, Inc., New York, N.Y.

Continuation of Ser. No. 226,063, Feb. 14, 1972, abandoned. This application May 26, 1978, Ser. No. 910,054

Int. Cl.[2] F28D *15/00*

U.S. Cl. 165—105 **4 Claims**



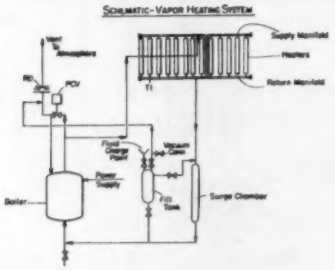
1. An improved heating apparatus of the multiple condensing-vapor substantially air-free type used for uniformly heating moving thread lines of yarn up to 350° C. and which includes a pressurized boiler containing a vaporizable liquid, means for heating the liquid in the boiler to generate hot vapor, means for distributing the hot vapor to the inside of multiple plates where the vapor condenses and thereby heats threadlines of yarn separately moved in frictional contact with an outer yarn-contacting surface of each hot plate, and possibly means for returning the condensate to the boiler wherein the improvement comprises:

having a coating on the inside surface of each said hot plate, said coating having a contact angle with said vaporizable liquid of at least 90°, said coating being a polyethylene glycol having from 4 to 12 carbon atoms and said vaporizable liquid comprising diphenyl ether and trace amounts of said polyethylene glycol.

4,176,712
YARN HEATING APPARATUS AND PROCESS

Lee H. Knox, and Malcolm P. Owens, both of Charlotte, N.C., assignors to Fiber Industries, Inc., New York, N.Y.

Division of Ser. No. 226,063, Feb. 14, 1972, Pat. No. 3,736,469.
This application Jan. 9, 1978, Ser. No. 867,735
Int. Cl.[2] F28D *15/00*
U.S. Cl. 165—105 8 Claims



1. An improved heating apparatus of the multiple condensing-vapor substantially air-free type used for uniformly heating downwardly moving threadlines of yarn up to 350° C. and which includes a pressurized boiler containing a vaporizable liquid comprising at least 99% water, means for heating the liquid in the boiler to generate hot vapor, means for distributing the hot vapor to the inside of multiple plates where the vapor condenses and thereby heats at least two threadlines of yarn separately moved in frictional contact with an outer yarn-contacting surface of each hot plate, and means for returning the condensate to the boiler, wherein the improvement comprises the combination of:

(i) an essentially permanent film-type coating on the inside surface of each said hot plate, said coating having a contact angle with said vaporizable liquid of at least 90° and being promotive of heat transfer; said coating being a filming amine selected from the group consisting of octadecylamine, hexadecylamine and dioctadecylamine;

(ii) said vaporizable liquid comprises up to 100 parts per million of said filming amine; and

(iii) each said hot plate comprises a bare steam pipe without a wear strip,

whereby there is an overall coefficient of heat transfer from said vapor to said yarns at least 1000 BTU/sq.ft./hr./° F. differential and said heat treated yarns have improved uniformity of properties such that said heat treated yarns made from said twin threadline process can be merged with a heat treated yarn made from a temporary single threadline process resultant from one of said twin threadlines breaking or running out.

4,176,713
PLATE-TYPE HEAT EXCHANGER

Helmut Fisher, Kunigberggasse 5, Vienna, Austria (1130)

Filed Feb. 7, 1977, Ser. No. 766,172
Claims priority, application Italy, Feb. 12, 1976, 20115 A/76
Int. Cl.[2] F28F *3/04*
U.S. Cl. 165—166 7 Claims

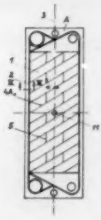
1. A plate-type heat exchanger, which comprises

at least three heat exchange plates which consist of press-formed sheet metal and are arranged in a row and have a fluid-guiding body each, which is formed with a plurality of corrugations which have ridges that define two parallel ridge planes on opposite sides of said plate, and

spacing means which are rigid with each of said plates and flush with one of said ridge planes thereof and extend between said ridges only in part of the length of said corrugations of said plate and contact the ridges of an adjacent plate,

said plates comprising first and second types of plates,

said corrugations of said plates of said first and second types, respectively, extending at equal and opposite, oblique angles to a center plane of said body which is normal to said ridge planes and having the same cross-section so that the center spacing of said plates equals the height of said corrugations,



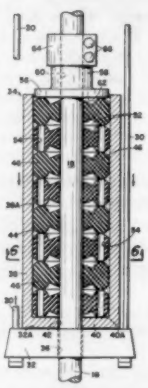
at least two adjacent ones of said plates having adjacent corrugations which are parallel to each other, and

at least two adjacent ones of said plates having adjacent corrugations which copies each other.

4,176,714
SHOCK ABSORBER FOR OIL WELL PUMPING UNIT

Richard W. Case, Tulsa, Okla., assignor to K-Shox, Inc., Tulsa, Okla.

Filed Jun. 15, 1978, Ser. No. 915,594
Int. Cl.[2] E21B *43/00*; F16F *1/34, 1/36, 3/08*
U.S. Cl. 166—72 2 Claims



1. A shock absorber for use with an oil well pumping unit having a horizontal hanger bar suspended by cables, the hanger bar being vertically reciprocated by the pumping unit, and a vertical polish rod having the lower end secured to a string of sucker rods for actuation of a pump in a well borehole, the hanger bar having an opening therein slidably receiving the polish rod, the shock absorber providing means of transferring lifting force from the hanger bar to the polish rod, comprising:

a tubular body having an open top and a closed bottom, the bottom having an opening therein slidably receiving the polish rod concentrically of the body tubular axis, the lower end of the body resting on said hanger bar, the body providing an annular area between the interior of the body wall and the exterior of the polished rod;

a plurality of elastomeric discs received in said body, each disc having a diameter slightly less than the interior diameter of the body, and each having an axial opening therein receiving the polish rod, each disc having an annular upper and lower recess intermediate the disc axial opening

and its periphery whereby the thickness of each disc is greater adjacent the axial opening and the periphery and of decreased thickness intermediate the axial opening and periphery, the recesses providing annular closed trapped air spaces between adjacent discs, and each disc having a plurality of secondary openings therethrough, the axii of which are spaced from and parallel the axis of the axial opening, the secondary openings being spaced from each other in equal angular relationship, the secondary openings extending through each disc in the area of maximum disc thickness adjacent the disc periphery, the discs being arranged so that the secondary openings are out of register and are thereby closed at each end by the exterior surfaces of the adjacent discs and whereby each secondary opening provides a closed air space;

a circular top plate having an axial opening therein receiving the polish rod, having a diameter slightly less than the internal diameter of the body and having a lower surface engaging the upper surface of the uppermost elastomeric disc; and

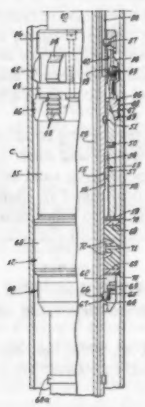
a polish rod clamp secured to the polish rod above and contiguous to said top plate, whereby when the pumping unit exerts upward force on the hanger bar the elastomeric discs compress in proportion to the total force transmitted to the polish rod, which compression constricts the volume of air spaces in the disc annular recesses and secondary openings whereby shock absorption is obtained by both the resiliency of the discs and by compressed air.

4,176,715

HIGH TEMPERATURE WELL PACKER

Eugene H. Bigelow, Long Beach, and Burton J. Goldsmith, Redondo Beach, both of Calif., assignors to Baker International Corporation, Orange, Calif.

Filed Dec. 23, 1977, Ser. No. 863,871
Int. Cl.[2] E21B *33/129*
U.S. Cl. 166—138 **20 Claims**



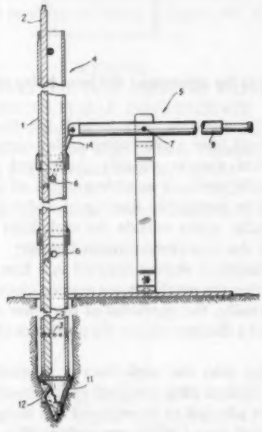
1. A well bore packing adapted to be set in a casing in a well, comprising: an elongated body, normally retracted slip means on said body, expander means on said body for expanding said slip means, control means releasably connecting one of said slip means and expander means to said body and enabling expansion of said slip means by said expander means in response to longitudinal movement of said body following release of said control means, an abutment on said body, a resiliently deformable packing between said abutment and the other of said slip means and expander means to be resiliently deformed into sealing engagement with said body in response to further longitudinal movement of said body following expansion of said slip means, one way locking means enabling said further longitudinal movement of said body and for holding said body shifted with said packing deformed and said slip means engaged with the casing, release means releasably connecting said abutment to said body for permitting relaxation of said packing upon release of said release means, said release means being releasable upon additional longitudinal movement of said body, and means for connecting said body to a pipe string for running and retrieving said packer.

4,176,716

METHOD AND APPARATUS FOR TAPPING GROUNDWATER

Herbert Bielaczek, Frankfurt-Sossenheim, Fed. Rep. of Germany, assignor to Robert Brehm, Grainau, Fed. Rep. of Germany, a part interest

Filed Jul. 11, 1977, Ser. No. 814,773
Claims priority, application Fed. Rep. of Germany, Jul. 14, 1976, 2631642; Dec. 30, 1976, 2659588
Int. Cl.[2] E21B *43/00, 49/02*
U.S. Cl. 166—254 **5 Claims**



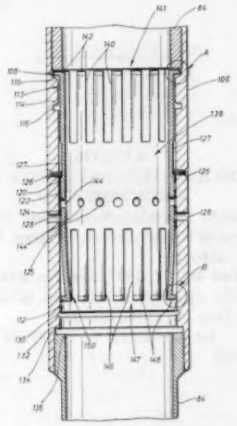
1. A method of sinking a shallow well and installing a pump therein, comprising the steps of sinking a probe into the ground, said probe being formed with means for accumulating soil; periodically extracting the probe from ground during its progressive sinking for examining successive soil samples until a water bearing stratum has been located and its depth determined; thereafter driving a riser tube into the ground to the previously determined depth; installing in the riser tube a water conveying conduit having a foot valve; and installing in the region of an upper end of the riser tube suction means which communicate with the conduit to aspirate water through the same.

4. In a combination for sinking a shallow well, an apparatus comprising a tubular probe composed of a plurality of longitudinally connectable sections and having a leading end adapted to be driven downwardly into the ground; and a guide rod movably mounted on said probe for movement therewith into the ground and displaceable relative to said probe for movement relative thereof, said rod having a portion located in the region of said leading end and provided with at least one soil-accumulating recess so that soil accumulated in said recess can be inspected for moisture traces when the rod is displaced upwardly and relatively to said probe which is meanwhile stationary in the ground.

4,176,717
CEMENTING TOOL AND METHOD OF UTILIZING SAME

Harold A. Hix, 716 N. Poplar, Kermit, Tex. 79745

Filed Apr. 3, 1978, Ser. No. 893,185
Int. Cl.[2] E21B 33/13, 33/16
U.S. Cl. 166—289 7 Claims



1. A method for cementing the bore holes of oil or gas wells comprising

a. providing at one or more suitable points along the length of the well liner a cementing collar comprising a pair of cylindrical sleeves slidably positioned one within the other each having a suitable number of spaced portholes adapted to permit the forcing of a slurry of cement into the annular space outside the well liner when the portholes in the two sleeves are in register;

said cylindrical sleeves situated in a first locked position such that the portholes are aligned circumferentially but not axially, the portholes of the inner sleeve being displaced a distance above the portholes of the outer cylinder;

b. inserting into the well liner a generally cylindrically shaped bottom plug designed to fall freely down the well liner but adapted to be engaged and stopped by the inner cylindrical sleeve of the cementing collar when it is in the first locked position thereby sealing off the well bore against a fixed hydraulic pressure;

c. applying a first hydraulic pressure through the well liner sufficient to cause the inner sleeve and plug to move downwardly in the well to a second position wherein the portholes of the inner and outer cylindrical sleeves of the cementing collar are in alignment;

d. pumping cementing slurry downward into the well liner and out through the portholes of the drilling collar sleeves to effect cementing of the bore hole;

e. inserting a cylindrical top plug into the well liner designed to be pumped down to and engage the top of the inner cylindrical sleeve when the inner sleeve is in the second position thereby sealing off the bottom plug against a fixed hydraulic pressure; and thereafter

f. applying a second hydraulic pressure through the well liner sufficient to force the inner sleeve and bottom plug out of the second position and cause them to move downwardly in the well to a third position thereby closing and sealing the port holes against communication with the well bore outside the liner and wherein the bottom plug is disengaged from the inner sleeve and released to fall freely to the well bottom.

2. Apparatus for use in cementing of oil or gas well bore holes and adapted to provide a plurality of portholes which can be opened and closed through the use of hydraulic pressure, which comprises:

an outer tubular member threaded at each end for attachment to sections of well liner, said outer tubular member having a plurality of circumferentially spaced portholes located intermediate the length thereof and extending radially therethrough the inside surface of the outer tubular member being provided with a series of four circumferential grooves suitably positioned two above and two below the plurality of portholes;

an inner tubular member slidably disposed with respect to said outer tubular member and having a plurality of circumferentially spaced openings extending radially therethrough and adapted to align identically with the portholes of said outer tubular member, the inner tubular member having an upper array of resiliently flexible fingers forming an upper collet ring, each of the fingers having an upper head and also having a lower array of resiliently flexible fingers forming a lower collet ring, each of the fingers having a lower head, the collet ring of the inner tubular member adapted to engage and be held by a circumferential groove on the inside surface of the outer tubular member;

the circumferential grooves of said outer tubular member being further defined in that they are sized and spaced in relation to the outer diameter and distance between the two collet rings of the inner tubular member such that when said inner tubular member is in a locked position, the upper heads are received in a first groove, the lower heads abut the interior of said outer tubular member at a location above a third groove with said lower fingers thereby defining a holding surface adapted to receive an opening means and said openings are spaced axially out of register with said ports, with said inner tubular member movably positioned in an intermediate position, the upper heads, adapted to receive a closure means, are disposed in abutting relationship to the inner surface of the outer member, the lower heads are received in a third groove and said portholes and said openings are radially aligned in register and with the inner tubular member movably disposed in a second locked position said upper heads are received in a second groove, said lower heads are received in a fourth locking groove and said openings are spaced axially out of register with said ports;

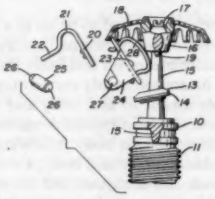
a locking means for preventing rotation of the inner tubular member with respect to said outer tubular member while at the same time permitting axial movement thereof; and

a plurality of seals positioned in spaced apart relation between said outer and said inner tubular members.

4,176,718
ANTI-LODGEMENT BAIL FOR SPRINKLERS

Theodore Vorkapich, Brunswick, Ohio, assignor to A-T-O Inc., Willoughby, Ohio

Filed Jan. 30, 1978, Ser. No. 873,222
Int. Cl.[2] A62C 37/12
U.S. Cl. 169—39 3 Claims



1. The combination of a sprinkler having a body member with a fluid delivery passageway therethrough, oppositely disposed arms on the body member joined at their outer ends to form a frame, a deflector on said frame and a closure on said

fluid delivery passageway, an assembly comprising a lever, a strut having a pair of spaced sidewardly extending apertured arms on one side thereof and a fusible element, said assembly disposed between said deflector and said closure; and an anti-lodgement bail on said strut and extending outwardly from the opposite side thereof with respect to said arms, a major portion of said bail being longitudinally arcuate and positioned in spaced substantially parallel relation to said strut, said bail arranged for registry against said frame and deflector of said sprinkler when said assembly is freed by action of the fusible element so as to space said strut and the arms thereon with respect to said frame and said deflector.

4,176,719

HEAT SENSITIVE RELEASE DEVICES

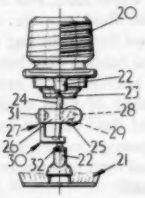
Geddes A. Bray, Manchester, England, assignor to Mather & Platt Limited, Manchester, England

Continuation of Ser. No. 776,057, Mar. 9, 1977, abandoned. This application Dec. 15, 1978, Ser. No. 970,074

Claims priority, application United Kingdom, Mar. 12, 1976, 9915/76

Int. Cl.[2] A62C *37/08*

U.S. Cl. 169—39 **7 Claims**



1. A heat sensitive release device comprising first and second relatively movable components, and a normally stable strut system located between the components to retain them in fixed positions relative to each other but collapsible on attainment of a predetermined temperature, the strut system comprising:

(a) a heat sensitive element,

(b) a catch element having opposed wings between which the heat sensitive element is retained,

(c) a lever fulcrummed on the first component and joined to the catch element,

(d) a strut engaging at one end on the lever adjacent the fulcrum and at its other end on the second component and bearing against the heat sensitive element to retain the lever and thereby the strut system in a stable condition, and

(e) an impediment joined to the strut system and disposed between the lever and the strut to prevent lever movement towards the strut and removal of the heat sensitive element from the catch element, whereby on attainment of the predetermined temperature the heat sensitive element disengages from the wings of the catch element and permits the lever to pivot about the fulcrum to disengage the strut from the second component which together with the first component are both freed for relative movement.

4,176,720

WELL CEMENTING IN PERMAFROST

William N. Wilson, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Jul. 27, 1978, Ser. No. 928,648

Int. Cl.[2] E21B *33/14*

U.S. Cl. 166—293 **12 Claims**

1. A process for cementing in the permafrost region of a wellbore comprising recovering at least part of the aqueous drilling fluid used in drilling a wellbore in the permafrost region, said drilling fluid containing from about 2 to about 16 volume percent solids, mixing with said drilling fluid an additive selected from the group consisting of lignosulfonate, lignite, tannin, and mixtures thereof in an amount of from about 0.05 to about 0.4 pounds per barrel per equivalent pounds per barrel of bentonite as determined by the methylene blue test, essentially contemporaneous with and/or subsequent to the addition of said additive, mixing with said drilling fluid sufficient of at least one base to raise the pH of the mixture into the range of from about 9 to about 12 and from about 50 to about 250 pounds per barrel of at least one cementitious material which will harden in from about 30 to about 40 hours at about 40° F., pumping the resulting final mixture into the permafrost region of the wellbore to be cemented, and allowing said mixture to harden in said wellbore.

7. A process for treating an aqueous drilling fluid after it has been used in drilling a wellbore in permafrost, said drilling fluid containing from about 2 to about 16 volume percent solids, comprising mixing with said drilling fluid an additive selected from the group consisting of lignosulfonate, lignite, tannin, and mixtures thereof in an amount of from about 0.05 to about 0.4 pounds per barrel per equivalent pounds per barrel of bentonite as determined by the methylene blue test, essentially contemporaneous with and/or subsequent to the addition of said additive, mixing with said drilling fluid sufficient of at least one base to raise the pH of the mixture into the range of from about 9 to about 12 and from about 50 to about 250 pounds per barrel of at least one cementitious material which will harden in from about 30 to about 40 hours at about 40° F.

4,176,721

DEPTH CONTROL FOR GROUND WORKING AGRICULTURAL IMPLEMENTS

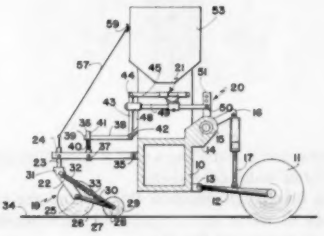
Erhard Poggemiller, Luseland, and Ralph Sweet, Forgan, both of Canada, assignors to Kep Enterprises, Luseland and Sweet Manufacturing Ltd., Forgan, both of, Canada

Filed Nov. 28, 1977, Ser. No. 855,277

Claims priority, application United Kingdom, Nov. 30, 1976, 49825/76

Int. Cl.[2] A01B *63/114*

U.S. Cl. 172—4 **10 Claims**



7. A first sensing means for agricultural implements, a ground engaging element attachable to said implement and means to set the depth of penetration of said ground engaging element with the ground; said first sensing means including a first ground engaging wheel, means mounting same for rotation and castoring action, a second ground engaging wheel journalled for rotation behind and in alignment with said first ground wheel, link means extending rearwardly from said first ground engaging wheel for journalling said second ground engaging wheel for rotation, said link means being pivotally connected to said means mounting said first ground engaging wheel, for movement of said second ground engaging wheel in a vertical plane, and spring means extending between said means mounting said first ground engaging wheel and said link means intermediate the ends thereof, normally urging said second ground engaging wheel into contact with the surface of the ground, said means mounting said first ground engaging wheel including a wheel fork, a spindle spanning said fork, said wheel being journalled for rotation upon said spindle, a fork

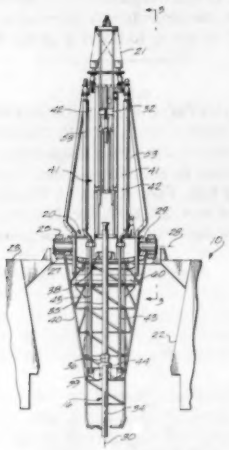
mounting shaft extending upwardly from said fork, means mounting said fork mounting shaft for castoring action of said first sensing means, said spring means including a rod pivotally connected by one end thereof to said link means, a sliding clevis secured to said wheel fork adjacent the upper end thereof, said rod slidably engaging said sliding clevis and a compression spring reacting between said sliding clevis and anchor means on said rod.

4,176,722

MARINE RISER SYSTEM WITH DUAL PURPOSE LIFT AND HEAVE COMPENSATOR MECHANISM

Sherman B. Wetmore, Westminster; James F. McNary, Santa Ana, and Abraham Person, Los Alamitos, all of Calif., assignors to Global Marine, Inc., Los Angeles, Calif.

Filed Mar. 15, 1978, Ser. No. 886,903
Int. Cl.[2] E21B 7/12
U.S. Cl. 175—7 **18 Claims**



1. Apparatus useful in drilling a well at a location submerged below a body of water comprising

a buoyant foundation structure floatable on the surface of the body of water and subject to vertical motion in response to waves and the like,

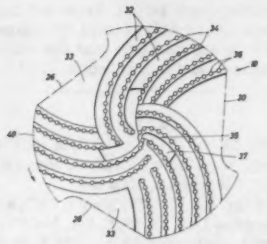
handling and tensioning means for moving a riser pipe along a substantially vertical line from and to the foundation structure into and out of connection of the lower end of the riser pipe with the submerged location and for applying tension to a riser pipe connected to the submerged location, the handling and tensioning means including vertically disposed hydraulic ram means mounted to the foundation structure at a location fixed vertically relative to the foundation structure, holding means releasably engageable with a riser pipe adjacent the upper end thereof and connected to the ram means for movement along said line in response to operation of the ram means, the ram means having an active first operating mode in which it is operable to lower and raise a riser pipe along said line into and out of said connection to the submerged location and a second operating mode in which it is operable during vertical motion of the foundation structure to apply a selected upward force to a riser engaged by the holding means and connected to the submerged location.

4,176,723

DIAMOND DRILL BIT

Leonce Arceneaux, Spring, Tex., assignor to DTL, Incorporated, Spring, Tex.

Filed Nov. 11, 1977, Ser. No. 850,471
Int. Cl.[2] E21B 9/36
U.S. Cl. 175—329 **17 Claims**



1. A diamond drill bit construction for drilling bores in earth formations and the like, said drill bit construction comprising:

a drill body having connection means formed thereon for connection with a drill stem, said drill body being formed to define internal fluid passage means through which drilling fluid flows during drilling operations;

a plurality of spaced bearing pads being formed on said drill body defining a portion of the external surface area and defining a plurality of fluid courses between adjacent bearing pads, said fluid courses being in communication with said fluid passage means said bearing pads engage said formation and limit penetration of said diamonds into said formation; and

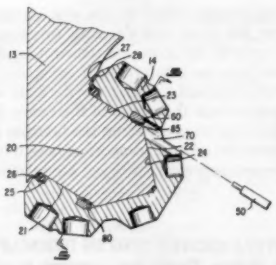
a plurality of diamonds being supported by said drill body and being arranged on each of said bearing pads, the leading portion of each of said diamonds being positioned at the trailing edge of a respective one of said fluid courses said diamonds extending substantially to the center of the bit.

4,176,724

ROTARY ROCK BIT AND METHOD OF MAKING SAME

Edward Vezirian, Fountain Valley, Calif., assignor to Smith International, Inc., Newport Beach, Calif.

Filed Nov. 14, 1977, Ser. No. 851,475
Int. Cl.[2] E21B 9/08
U.S. Cl. 175—369 **31 Claims**



1. A rotary rock bit comprising a main bit body having at least one leg extending downwardly therefrom and a cutter assembly, said cutter assembly comprising:

a journal pin projecting from said leg, said journal pin having a cylindrical bearing surface and an annular groove formed thereon;

a cutter element rotatively supported on said journal pin, said cutter element having a radially inward bearing sur-

face frictionally engaging the bearing surface of said journal pin;

an annular thrust member mounted within the groove formed in said journal pin, said thrust member having an outer radial surface engaging the bearing surface of said cutter element, said thrust member including at least one surface which engages a bearing surface of said journal pin for transferring the in-thrust load from the said cutter element to said journal pin; and

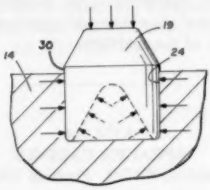
a weld fusing substantially the entire engaging surfaces of said thrust member and said cutter element.

4,176,725

EARTH BORING CUTTING ELEMENT ENHANCED RETENTION SYSTEM

Santos Shields, Arlington, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Aug. 17, 1978, Ser. No. 934,292
Int. Cl.[2] E21B *9/08*
U.S. Cl. 175—374 **2 Claims**



1. In an earth boring apparatus having a body member retaining at least one insert, wherein upon assembly of said insert in said body member said insert is positioned in a socket in the body member, said insert having a bottom portion and a bottom surface being located in said socket, the improvement comprising:

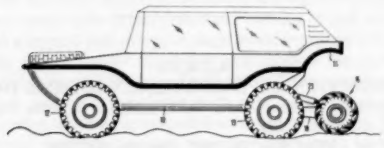
at least a substantial portion of both said bottom surface of said socket and said insert bottom portion having matching tapers so that the insert and socket have an improved fit wherein said bottom surface of said socket and said insert bottom portion are in engagement causing said bottom surface of said insert to tend to diverge when assembled, said divergence increasing the friction between insert and socket.

4,176,726

AMPHIBIOUS VEHICLE

Hans Schaeff, Langenburg, Fed. Rep. of Germany, assignor to HFM Hohenloher Fahrzeuge- und Maschinenvertrieb GmbH, Langenburg, Fed. Rep. of Germany

Continuation of Ser. No. 790,040, Apr. 22, 1977, abandoned.
This application Jun. 6, 1978, Ser. No. 913,237
Claims priority, application Fed. Rep. of Germany, Apr. 23, 1976, 2617834
Int. Cl.[2] B60B *15/00*
U.S. Cl. 180—15 **10 Claims**



1. A land vehicle comprising:

an undercarriage having front and rear pairs of ground wheels, at least one of said pairs being driven,

a vehicle body mounted on said undercarriage,

auxiliary drive means comprising thrust roll means extended substantially across the width of the vehicle and being divided into two similar drive roll sections said auxiliary drive means being driveable independently of said at least one pair of driven ground wheels,

each of said drive roll sections being rotatably mounted about a transverse axis with each section being secured to a separately controlled pivot arm pivotally mounted on said vehicle, the pivot arms being operable independently from one another so that one arm may pivot while the other arm remains stationary,

said drive roll sections and said pivot arms being independently movable between a lower position wherein said drive roll sections are biased against the ground and an upper position wherein said sections are partially covered by said vehicle body and out of contact with the ground,

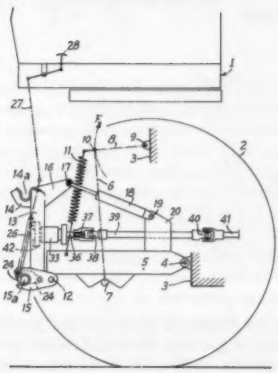
said drive roll sections being of a rubber-like material and having a ribbed pattern thereon.

4,176,727

DEVICES FOR AUTOMATICALLY COUPLING IMPLEMENTS TO SELF-PROPELLED ARTICLES

Philippe Périn, Meudon, France, assignor to Societe Fiat France, S.A., Paris, France

Division of Ser. No. 666,011, Mar. 11, 1976, Pat. No. 4,090,725.
This application Dec. 23, 1977, Ser. No. 863,630
Claims priority, application France, Mar. 19, 1975, 75 08579
Int. Cl.[2] B60D *1/04*; B60K *17/28, 25/06*
U.S. Cl. 180—53 R **3 Claims**



1. A self propelled vehicle including means for coupling an implement thereto comprising:

(a) a chassis:

(b) a device mounted on the chassis for automatically coupling an implement to said vehicle comprising:

(1) a rigid member having opposed end portions, said member being pivotally connected at one end portion to the chassis and extending generally horizontally,

(2) lifing means mounted on a hitching frame,

(3) suspension means connecting said rigid member to said lifting means,

(4) said hitching frame pivotally mounted at the other end portion of the rigid member, said hitching frame including jaw clamping means for releasably engaging said implement, and

(5) a double-acting ram operative to pivot the hitching frame, said vehicle further comprising

(c) a driving member,

(d) a drive transmitting system connected to the driving member including:

(1) a universal joint

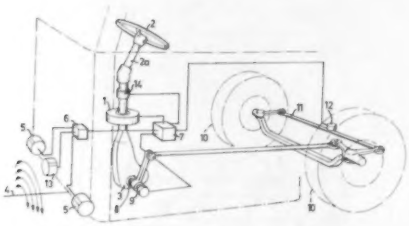
(2) a shaft

(3) a housing mounted on said hitching frame, bearing means mounted in said housing rotatably supporting said shaft,
(4) slide coupling means connecting the shaft to the drive-transmitting system,
(5) driving clutch plate means rigid with the shaft, having teeth with a conical leading edge
(e) an implement having driven components and driven clutch plate means operatively connected to said driven components, said driven clutch plate means having teeth having conical leading edges designed to mate with said teeth of said driving clutch plate means and having entraining surfaces at right angles to the surface of said clutch plate means
(f) said implement further comprising a splined shaft, slideable sleeve means rotatable with said spline shaft, said sleeve means being rigid with the driven clutch plate means, housing means rigid with said spline shaft, said housing means including an abutment, and spring means interposed between the housing means and the driven clutch plate means to bias said driven clutch plate means axially of the splined shaft toward said driving clutch plate means, said abutment restricting axial movement of the driven clutch plate means under the bias of the spring means.

4,176,728
COMBINED AUTOMATIC AND MANUAL GUIDANCE SYSTEM

Sven I. A. Otteblad, Partille; Erner T. O. Brynielsson, Borgholm; Ralph G. Dovertie, Göteborg; Stig E. R. Franzén, Västra Frolunda, and Hans E. O. Brelén, Skövde, all of Sweden, assignors to AB Volvo, Goteborg, Sweden

Filed Mar. 21, 1977, Ser. No. 779,934
Int. Cl.[2] B62D *1/24*
U.S. Cl. 180—168 **7 Claims**



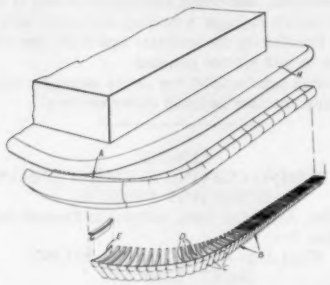
1. A system for combined automatic and manual steering of a vehicle, comprising at least one manual steering means and an automatic equipment with at least one executing means, said executing means being coupled to said manual steering means such that a counterforce is generated in said manual steering means to the force applied by the driver, said counterforce being a function of the deviation, produced by the driver, from a steered path of said vehicle as predetermined by said automatic equipment, said automatic equipment being such that over the whole steering range, said counterforce is less than the force that the driver is able to apply on said manual steering means.

4,176,729
ATTACHMENT OF HOVERCRAFT FINGERS

Clive L. C. Down, Trowbridge, England, assignor to Avon Industrial Polymers (Melksham) Limited, England

Filed Aug. 11, 1977, Ser. No. 823,692
Claims priority, application United Kingdom, Aug. 19, 1976, 34685/76
Int. Cl.[2] B60V *1/16*
U.S. Cl. 180—127 **4 Claims**

1. In a flexible connecting element for connecting at least one finger to a loop in a skirt of a hovercraft and having a first portion for attachment to at least one finger, the improvement comprising a pair of discrete strips of flexible elastomer-coated material forming the element and bonded face-to-face over part of their area to define the first portion, there being in a given cross-section of the element an unbonded part of the area of the strips to define a pair of flaps connected to the first

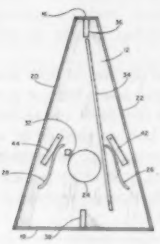


portion, the bonded part being delimited by a curved edge conforming to the curvature of the undersurface of the loop, each said unbonded part being longitudinally subdivided to define a plurality of the said flaps.

4,176,730
SPEAKER CABINET

Nicholas M. Mushkin, 4755 E. Flaming Rd., Las Vegas, Nev. 89109

Filed Jan. 30, 1978, Ser. No. 873,140
Int. Cl.[2] H05K *5/00*; G10K *11/00*; A47B *81/06*
U.S. Cl. 181—148 **9 Claims**



1. A speaker cabinet having a speaker mounted therein comprising an enclosure having top and bottom, two side and front and back panels, each side panel being contiguous with the top, bottom, front and back panels, a sound post wedged and extending between said front and back panels, said front panel having a sound port for said speaker, and an elongated bar extending towards said top and bottom panels and at least two-thirds of the distance between and secured substantially along its entire length to said front panel and without contact with any other panel.

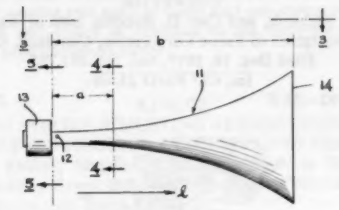
4,176,731
TWO-SECTION EXPONENTIAL ACOUSTICAL HORN

Rex Sinclair, Garden Grove, Calif., assignor to Altec Corporation, Anaheim, Calif.

Filed Nov. 21, 1977, Ser. No. 853,204
Int. Cl.[2] G10K *11/00*
U.S. Cl. 181—192 **6 Claims**

1. A two-section exponential horn comprising:
a first section between the throat of the horn and a predeter-

mined point therealong having a first exponential flare rate, m_1, and



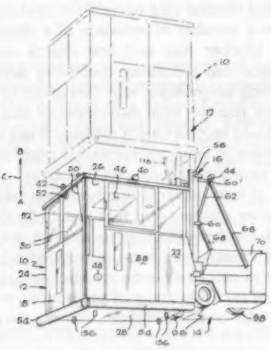
a second section between said predetermined point and the mouth of the horn having a second exponential flare rate, m_2, which is greater than m_1.

4,176,732

SELF-PROPELLED AIRCRAFT PASSENGER ELEVATOR

Robert A. Nordskog, 18135 Karen Pl., Tarzana, Calif. 91356

Filed Jan. 12, 1978, Ser. No. 868,812
Int. Cl.[2] B66F *9/14*
U.S. Cl. 187—9 E **24 Claims**



1. In a self-propelled elevating unit:

a substantially square-shaped cabin adapted to be raised and lowered from one level to another, said cabin including sliding doors providing easy access and exit therefrom, and all-around windows to provide maximum ground visibility;

a self-propelled vehicle for moving said cabin from one location to another, said vehicle including a pair of horizontally-spaced driven front ground wheels a driving rear wheel centrally at the rear of said vehicle for providing directional movement thereto, and a frame and a housing mounted on said frame;

a lift assembly intermediate said cabin and said vehicle, said lift unit including a mast oriented upwardly relative to said vehicle and comprising a first pair of lower stage guide members horizontally spaced and rigidly secured at their lower ends to said frame and housing of said vehicle, and a second pair of upper stage guide members horizontally spaced rigidly secured to said cabin at the rear end thereof, an extendable and retractable lifting member and chain assembly associated with said latter member for effecting telescoping up-and downward movement of said second upper stage guide members relative to said first lower stage guide members to thereby raise and lower said cabin from said one level to the other;

means for mounting said upper stage guide members to said cabin;

stop means for preventing displacement of the mounting means relative to said cabin;

electrically-powered, hydraulically actuating propulsion units in said vehicle within said housing thereof for transmitting motive power to said pair of driven front ground wheels, said lifting member and to said rear wheel to effect steering movement of said latter wheel; and

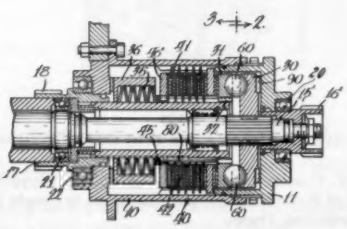
operating control means in said cabin for controlling said self-propelled vehicle and said cabin.

4,176,733

COMBINATION NO-BACK BRAKE AND TORQUE LIMITER ASSEMBLY

Robert G. Twickler, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Apr. 26, 1978, Ser. No. 900,314
Int. Cl.[2] B60T *7/12*
U.S. Cl. 188—134 **14 Claims**



1. A combination no-back brake and torque limiter assembly comprising, a casing, a rotatable input shaft, a rotatable output shaft, a pair of opposing discs rotatably connected one to each of the input and output shafts, brake means associated with the output shaft including at least spaced-apart brake elements carried by the casing and interleaved brake elements therebetween and rotatable with the output shaft, spring means urging the brake elements toward the disc on the output shaft and into no-back braking pressure engagement, means including interacting elements between said opposing discs to increase the space therebetween for acting on the spring means to reduce the pressure engagement of the brake means and then release pressure engagement upon creation of a predetermined torque difference between the input and output shafts, and means including said interacting elements between said opposing discs for further increasing the space between said discs and acting on the spring means and exerting force on the brake means to obtain torque limiting braking pressure engagement as the torque applied to said input shaft approaches a maximum value.

4,176,734

FRAME STRUCTURE FOR SOFT-SHELLED LUGGAGE

Wan-Ching Wang, Taipei, Taiwan, assignor to Kodama Taiwan Industrial Co., Ltd., Taipei, Taiwan

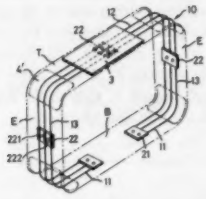
Filed Apr. 24, 1978, Ser. No. 899,169
Int. Cl.[2] A45C *13/04*
U.S. Cl. 190—49 **14 Claims**

12. A soft-shelled luggage having a resilient frame structure, comprising:

a soft luggage shell including front, back and side walls;

at least two wires extending continuously over substantially the entire length of the side walls, said wires spaced apart from each other in a generally parallel arrangement; and

fastening means for securing the wires to the side walls of the luggage, said fastening means including means for



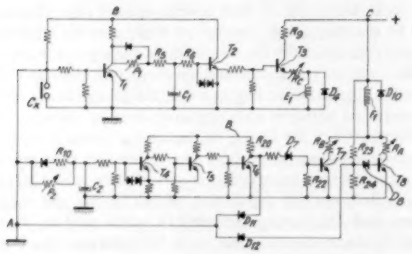
maintaining the wires in the generally parallel arrangement.

4,176,735

HIGH-SPEED APPARATUS FOR OFF-WINDING THREAD

Jacques V. L. Cousin; Marcel E. R. Decroix, and Hyppolite P. Gouy, all of Wervicq-Sud, France, assignors to Cousin Freres S.A., Wervic-Sud, France

Continuation of Ser. No. 621,505, Oct. 10, 1975, abandoned. This application Aug. 15, 1977, Ser. No. 824,742
Claims priority, application France, Oct. 14, 1974, 74 34412
Int. Cl.[2] F16D *67/06*
U.S. Cl. 192—12 D **12 Claims**



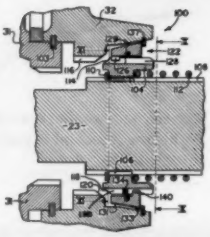
1. An apparatus for off-winding thread comprising a driving shaft, a drive means for rotating the driving shaft, a driven shaft, an electrically operated clutch interconnecting said driven and driving shafts, an electrically operated brake connected to said driven shaft, and an electronic control circuit comprising a first part connected to said clutch and incorporating an integrating circuit for producing gradual engagement of the clutch, a second part connected to said brake and incorporating a pulse generating circuit for producing a large temporary braking force, and a third part connected to said brake and incorporating a constant signal generator for producing a small constant braking force, wherein said brake and clutch are electro-magnetically operated and each has a control winding appropriately connected to said control circuit, said control winding of said brake is also connected to an output of said first part of the electronic control circuit, and diode means are coupled to said control winding of the clutch and said control winding of the brake in such a manner that current can flow through only one of these windings at a given moment.

4,176,736

BLOCKED CHANGE GEAR TRANSMISSION AND IMPROVED BLOCKER AND JAW CLUTCH ASSEMBLY THEREFOR

Elmer A. Richards, and Carl D. Roberts, both of Kalamazoo, Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Dec. 19, 1977, Ser. No. 861,785
Int. Cl.[2] F16D *23/06*
U.S. Cl. 192—53 F **27 Claims**



1. An improved blocker and jaw clutch assembly of the type comprising a substantially non-deformable blocker ring splined to a first of two axially engageable positive clutch members for rotation therewith with a predetermined relative rotation therebetween, said blocker ring operable to tend to rotate with said second clutch member at initiation of a clutch engaging operation, said blocker ring and first clutch member each having first projections extending therefrom defining a first array of interacting projections, said first array of projections effective to block relative axial movement of said first clutch member toward said second clutch member if not aligned, said blocker ring having at least one rotational position relative to said first clutch member wherein said first array of projections are aligned and at least one rotational position relative to said first clutch member wherein said first array of projections are misaligned, said blocker effective to sense non-synchronous rotation of said clutch members corresponding to blocker rotation relative to said first clutch member sufficient to cause a misalignment of said first array of projections to block axial engagement of said clutch members, the improvement comprising:

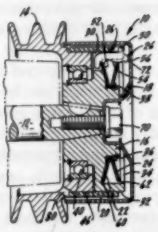
selectively actuated means associated with said blocker ring and said first clutch member effective to cause alignment of said first array of projections upon axial separation of said clutch members.

4,176,737

DRIVE MECHANISM

Richard W. Roberts, Lombard, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Nov. 21, 1977, Ser. No. 853,164
Int. Cl.[2] F16D *43/25, 13/08*
U.S. Cl. 192—82 T **6 Claims**



1. A thermally responsive drive mechanism for connecting a driving shaft to a driven pulley including a clutch surface on

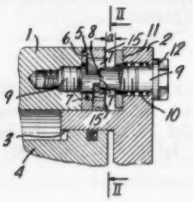
said shaft and a clutch surface on said pulley, a wrapping coil spring clutch element in engagement with both surfaces, an engaging pawl mounted adjacent said spring, a pair of bimetallic washer means in contact with said pawl, said pair of washer elements causing said pawl to cause said coil spring to connect said shaft and pulley in response to the temperature being within a predetermined range.

4,176,738

PISTON STROKE ADJUSTING ARRANGEMENT FOR DISC-TYPE FRICTION CLUTCHES AND BRAKES

Jury V. Katkov, Moscow, U.S.S.R., assignor to Moskovsky Automobilny Zavod imeni I.A. Likhacheva (Proizvodstvennoe Obiedinenie Zil), U.S.S.R.

Filed Jun. 27, 1977, Ser. No. 810,288
Claims priority, application U.S.S.R., Jun. 29, 1976, 2380121
Int. Cl.[2] F16D *13/75*
U.S. Cl. 192—111 R **3 Claims**



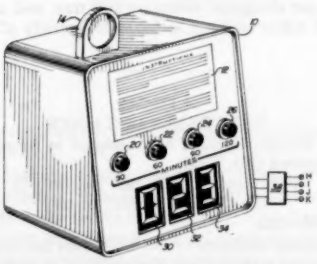
1. A piston stroke adjusting arrangement for disc-type friction brakes and clutches, comprising: a housing; a groove made in said housing; a flange of a cylinder rigidly secured to said housing with aid of a fastening member; a reciprocating piston accommodated in said cylinder; a washer accommodated in said groove and interposed between said housing and said flange of said cylinder, adapted to limit the axial stroke of said piston; radial recesses of different depths, made in said washer; an abutment carried by said flange, coaxially with said fastening member; said abutment being adapted to engage one of said radial recesses and having a width equalling that of this recess.

4,176,739

COIN ACTUATED TIMER WITH AUDIO OUTPUT

Edward J. Corcoran, Jr., 4528 W. Shaw Butie, Glendale, Ariz. 85304

Filed Feb. 10, 1978, Ser. No. 876,747
Int. Cl.[2] G07F *17/00*
U.S. Cl. 194—9 T **9 Claims**



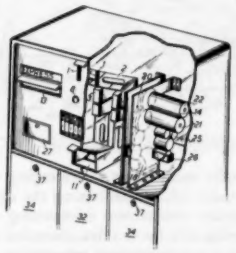
1. Coin operated timing apparatus comprising, in combination:
coin receptor means for receiving a coin;
coin identification means for identifying the coin received by the coin receptor means;
switch means for selecting a time period in response to the coin received by the coin receptor means and identified by the coin identifying means;
timing means for enabling the switch means and for limiting the time in which the switch means may be activated to select the time period;
timer means including clock means for counting the selected time period; and
output means for producing an output signal at the end of the selected time period.

4,176,740

AUTOMATICALLY STAMPING MAILBOX

Hsieh Tzu-Yen, No. 8-2, Alley 36, Lane 31, Yu Ying St. Ching Mei Town,, Taipei, Taiwan

Filed Aug. 22, 1977, Ser. No. 826,744
Int. Cl.[2] G07F *17/12*
U.S. Cl. 194—9 R **3 Claims**



1. An automatic coin-operated stamping mailbox comprising:
a casing having a coin slot, a letter slot, a coin return opening, a letter cabinet and a coin cabinet;
a coin selector;
a coin collector;
a coin counter, said selector, collector and counter being mounted in said casing and forming a correct coin path between said coin slot and said coin cabinet, said coin collector comprising a coin controller pivotally arranged in said coin path to be turned to a certain angle by the impact force and weight of a coin, a cam operatively connected to said controller to be turned thereby, and a first normally open spring-loaded electrical switch operatively associated with said cam being closed when said cam is rotated by said controller;
an electrical power source in said casing;
a pilot light, said source and said light being in a first electrical loop with said first switch;
a pair of rollers aligned in parallel with said letter slot in said casing, one of said rollers having a carved stamp mark thereon, said rollers defining a letter path between said letter slot and said letter cabinet;
inking rollers inkingly associated with said pair of rollers to ink said stamp mark;
a second normally open spring-loaded electrical switch mounted before said rollers in said letter path;
a third normally open spring-loaded electrical switch mounted after said rollers in said letter path;
an electrical motor mounted in said casing, said motor being in a second electrical loop with said second switch which includes said source, said light and said first switch and said motor also being in a third electrical loop with said source, said light, and said third switch;
a first gear system mechanically connecting said motor and said pair of rollers to rotate the same; and
a second gear system operatively connecting said motor to said coin controller,
whereby when a correct coin is inserted through said coin slot, said coin controller is turned closing said first switch lighting said light, thereafter when a letter is inserted through said letter slot said second switch is closed starting said motor turning said pair of rollers marking the

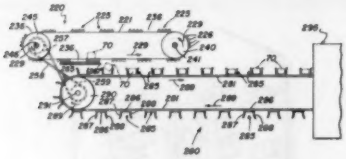
letter, as the letter is marked said third switch is closed, said second gear system permits the coin to continue to said coin cabinet, said third switch opening and stopping said motor only after the letter clears said rollers dropping into said letter cabinet.

4,176,741

ARTICLE TRANSFER MECHANISM

Walter H. Vogel, Hoffman Estates, Ill., assignor to Redington Inc., Chicago, Ill.

Filed Sep. 15, 1977, Ser. No. 833,435
Int. Cl.[2] B65G *47/26*
U.S. Cl. 198—457 **7 Claims**



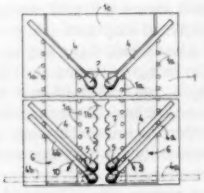
1. Article transfer mechanism for changing the direction of movement of articles while maintaining the orientation of the articles, the transfer mechanism comprising an infeed conveyor for conveying articles in a first direction while maintaining the articles in a predetermined orientation, a transfer conveyor in the form of a continuous belt having a plurality of groups of rollers with windows therebetween open at the tops and bottoms thereof for receiving articles through the tops from said infeed conveyor in the predetermined orientation, an article conveyor having a plurality of pockets thereon open at the tops thereof for receiving articles through the tops thereof from said transfer conveyor in the predetermined orientation for conveying the articles in a direction different from that of said infeed conveyor, retainer structure closing the bottoms of each of said windows as it arrives in position to receive an article from said infeed conveyor and opening the bottom of each of said windows as it arrives in position to deposit an article into one of said pockets on said article conveyor, whereby said article transfer mechanism transfers articles from said infeed conveyor moving in one direction with the articles in a predetermined orientation and deposits the articles in pockets on said article conveyor moving in another direction while maintaining the articles in the predetemined orientation.

4,176,742

MATCH CARRIER INCLUDING FRANGIBLE PROTRUSIONS

Henri Mühlethaler, Yverdon, Switzerland, assignor to Henri Muhlethaler S.A., Vaud, Switzerland

Filed Apr. 13, 1978, Ser. No. 895,745
Claims priority, application Switzerland, Apr. 21, 1977, 4933/77
Int. Cl.[2] A24F *27/20*
U.S. Cl. 206—98 **6 Claims**



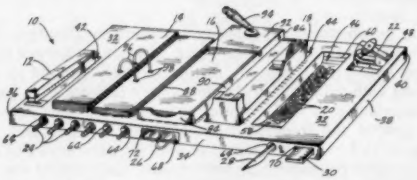
1. A match carrier comprising, a support of generally quadrangular plate configuration having a central rib extending along one axis of said support, said rib having two longitudinal lateral faces defining a plurality of alveoles with walls of generally arc-shaped configuration, a plurality of matches arranged in ear way rows upon said support and not extend beyond the edges of said support, a friction-strip carried by said support, a resilient bearing member of generally quadrangular plate configuration secured along its middle portion to said central rib and bearing along two opposed edges thereof on said matches, the axis of said bearing member being aligned with the axis of said support, said matches having ends which extend beyond said two opposed edges of said bearing member and having heads opposite said ends with said heads being partially engaged in said alveoles, whereby exertion of a force on the end of a selected match rotates the match head in ball-joint fashion in its corresponding alveole to move said selected match into a disposition which is perpendicular to an adjacent edge of said support with the end of said selected match extending beyond said edge to permit exertion of a traction force on said selected match to cause said match head to slip on said friction-strip against which it is applied by said bearing member and thereby kindle said selected match.

4,176,743

PORTABLE DESK TOP TRAY

Thomas J. Fitzpatrick, 505 S. 150 Cir., Omaha, Nebr. 68154

Filed Jul. 26, 1978, Ser. No. 927,962
Int. Cl.[2] B43M *17/00*
U.S. Cl. 206—214 **16 Claims**



7. In combination,
a plurality of desk implements,
a portable tray for organizing and arranging said implements, said tray including
a top surface,
means for supporting said top surface in spaced relation above a supporting surface,
said top surface having a plurality of laterally spaced apart openings, each opening being adapted to receive a respective desk implement and being of a configuration to laterally confine the respective implement, when received therein, against substantial horizontal movement, and
at least one elongated socket on said tray, said socket positioned below said top surface and laterally of said openings.

4,176,744

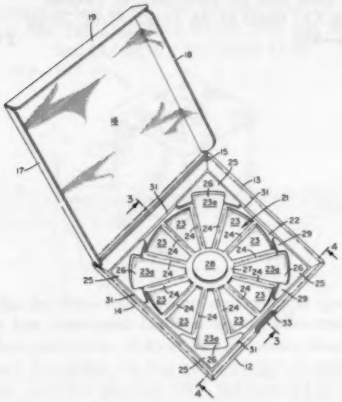
TAPE REEL CONTAINER

Robert A. Borzak, Opelika, Ala., assignor to Ampex Corporation, Redwood City, Calif.

Filed Apr. 21, 1978, Ser. No. 898,655
Int. Cl.[2] B65D *85/67, 85/671*
U.S. Cl. 206—303 **9 Claims**

1. A tape reel container of the flat-walled box type having a reel supporting tray portion, characterized in that;
at least two diametrically opposite parts of the periphery of said tray portion are formed with steps having downward and outwardly facing portions confronting corresponding portions of opposite side walls of said container;
said corresponding portions of said side walls are each formed with an inward and downwardly folding flap snugly engaging said tray step, so as to both retain and be retained by said tray portion; and
said tray portion is dimensioned with respect to said box so

that said outwardly facing portions of the tray laterally engage and are snugly bracketed by said corresponding portions of the opposite sides and said tray is securely



retained by said flaps against removal excepting as by convex upwardly bowed flexing of the entire tray and particularly the middle portion thereof.

4,176,745

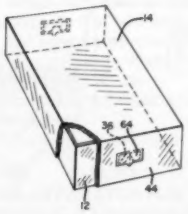
SHIPPING CONTAINER

Ray H. Stollberg, Gilroy, Calif., assignor to Crown Zellerbach Corporation, San Francisco, Calif.

Continuation-in-part of Ser. No. 906,190, May 15, 1978. This application Oct. 30, 1978, Ser. No. 955,815

Int. Cl.[2] B65D *85/50*

U.S. Cl. 206—423 **6 Claims**



1. A shipping container for cut flowers and the like comprising:

a tray including a bottom wall and a plurality of tray side walls extending from said bottom wall, at least one of said tray side walls having an aperture formed therein and a tray closure flap manually movable between an open and closed position relative to said aperture;

a cover for placement on said tray, said cover including a top wall and depending cover side walls, at least one of said cover side walls having an aperture formed therein, said apertures being in registry when said cover is placed on said tray, said cover additionally including a cover closure flap manually movable between an open and a closed position relative to said cover aperture; and

lock means on said cover closure flap for selectively retaining both said tray and cover closure flaps in open position.

4,176,746

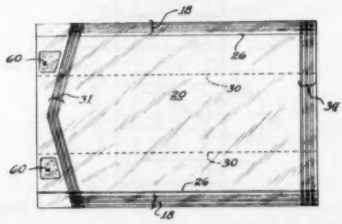
GUSSET POUCH WITH INTEGRAL SEAL SUPPORT AND METHOD OF MAKING SAME

Edward Kooi, Jersey City, N.J., assignor to Arvey Corporation, Chicago, Ill.

Filed Jul. 10, 1978, Ser. No. 923,358

Int. Cl.[2] B65D *27/32*

U.S. Cl. 206—438 **10 Claims**



1. A two-ended, tear resistant, gusseted package sealed inwardly of a first end and open at a second end for receiving an article therein and which can be subsequently closed at the second end, said package comprising:

first and second webs of material, said first web having a transverse dimension greater than the second web, said webs having first end edges at said package first end and second end edges at said package second end, said webs further having closure forming means at said first end of said package spaced inwardly of said first end edges for sealing said webs at said first end and thereby defining graspable unsecured margin portions of each web adjacent said first end edges, said webs further having a pair of substantially coterminous opposed side edges, said first web having first and second spaced parallel fold lines adjacent each side edge to produce an inwardly extending first portion and an outwardly extending second portion in overlapping relation whereby a gusset is formed in said first web adjacent each side edge thereof;

means for adhering said first web to said second web to form a seal adjacent the two side edges of said first and second webs;

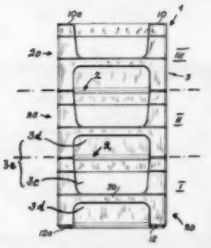
said closure forming means including 1) means sealing the adjacent facing surfaces of said first and second webs between said second fold lines, 2) means sealing said inwardly extending first portions of said first web to the adjacent facing inner surface of the first web, and 3) means securing the outwardly extending second portions of said first web to the adjacent facing surface of said second web; and

reinforcing means securing the inner surface of said inwardly extending first portions of said first web to the adjacent facing inner surfaces of said first web, said reinforcing means being disposed between said package first end and said closure forming means outwardly of said second fold lines over the major portion of the distance between said first and second fold lines and being disposed with peripheral boundaries generally parallel to said second fold lines for increasing the tear resistance of said first web when said first and second webs are grasped at said graspable margin portions and pulled outwardly relative to each other.

4,176,747
STACKABLE CRATES

Leo E. Aho, Tampere, Finland, assignor to Sarvis Oy, Tampere, Finland

Continuation of Ser. No. 727,846, Sep. 29, 1976, abandoned. This application Mar. 15, 1978, Ser. No. 886,778
Int. Cl.[2] B65D *21/02*
U.S. Cl. 206—509 7 Claims

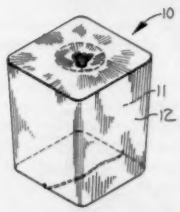


1. A stackable plastic crate (**20**) for transportation and storage of goods, e.g. containers for fluids and the like, and particularly for milk carton containers, comprising, in combination: a main case (**1**) constituted by front (**3**), rear (**4**) and two side (**5, 6**) walls, said side walls being shorter than said front and said rear walls; a single detachable, pivotable bottom (**2**) of the grating (*2a*) type in said main case, which latter has an open top; said side walls having therein a pair of hinges (*2c*) for pivoting said bottom within said main case between a lowered, substantially horizontal closed position and a partly upwardly open position; a peripheral bottom border (**12**) below said walls and inwardly spaced from bottom edge sufaces (*12a*) of said walls; transversal (*9b*) and peripheral (**10, 11**) bracing and reinforcing ribs, the latter including a top border (**10**) above said side walls and said front and said rear walls and defining top edge surfaces (*10a*) thereof, said top border being somewhat wider than said bottom border so that said borders constitute stacking means cooperating with such borders of adjoining identical crates when the crate is made to form part of a vertically superposed stack (I, II, III . . .); at least one of said front and rear walls having therein a pair of axially spaced, substantially rectangular apertures, the upper aperture having a U-shape and being bounded by a bottom edge and two spaced side edges, the spacing of the two side edges defining a discontinuity of the top border and the top edge surfaces, the lower aperture having an inverted U-shape and being bounded by a top edge and two spaced side edges, the spacing of the side edges of the lower aperture defining a discontinuity of the bottom border and the bottom edge surfaces; a narrow transverse wall section (*3b*) between said apertures in said one wall spacing said apertures apart and located about halfway the overall height of said main case; said apertures and said stacking means defining mating means for forming a peripherally enclosed and substantially rectangular access opening between two of the adjoining identical crates when the crate forms part of the stack, said upper aperture of a lower crate (I) and said lower aperture of an upper crate (II) from the two crates in the stack constituting together a contiguous, combined aperture (*3e*) defining said access opening, the opening the total height of which nearly corresponds to that of said main case; whereby goods are removable from the stack of crates laterally through said combined aperture when said bottom of a crate immediately above a combined aperture is in its open position.

4,176,748
SPECIAL PACKAGE AND METHOD

Frank T. Beane, Rte. 7, Hwy. 49, Concord, Cabarrus County, N.C. 28025

Filed May 10, 1978, Ser. No. 904,486
Int. Cl.[2] B65D *85/54, 19/22, 85/62, 29/00*
U.S. Cl. 206—525 2 Claims

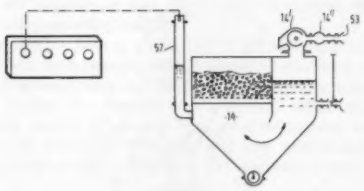


1. A package comprising a molded, slick-surfaced salt block having predetermined cross-sectional dimensions and knitted fabric bag means encircling said block for protecting said block against damage during handling and for enhancing frictional engagement of the package with adjacent surfaces, said bag means comprising crimped, synthetic multifilament yarn formed with locked stitches into a circular knit tube having a diameter when in relaxed condition which is less than said cross-sectional dimensions of said block whereby said bag is tensioned about said block so as to open said stitches of said fabric bag.

4,176,749
MATERIALS SEPARATION

Walter M. Wallace, Carlisle, and Geoffrey F. Craven, Bradford, both of England, assignors to Nortn-Harty Colliery Engineering Limited, England

Filed Jan. 12, 1978, Ser. No. 868,931
Claims priority, application United Kingdom, Jan. 15, 1977, 1659/77; Apr. 30, 1977, 18172/77
Int. Cl.[2] B03B *5/24*
U.S. Cl. 209—457 21 Claims



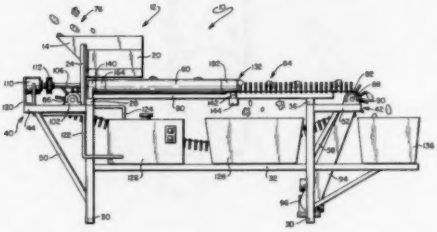
1. A method of controlling the operation of a wash box in the form of a vessel divided vertically into water containing compartments and having a perforate grid plate extending across upper parts of the compartments, means being associated with the vessel which is operative to apply pulsations to the water in the compartments to produce a cyclic rise and fall of liquid in the compartments, said method involving the steps of:

(a) transmitting wave energy towards the surface of the liquid in one of said compartments;
(b) receiving a reflected signal therefrom;
(c) comparing a function of the transmitted signal with a function of the received signal to derive a comparative value;
(d) acting arithmetically upon successive comparative values to derive an output signal; and
(e) utilizing said output signal to control the operation of the wash box.

4,176,750
SORTING SYSTEM AND APPARATUS

Robert G. Holmes, Columbus, Ohio, assignor to Ohio Agricultural Research and Development Center, Wooster, Ohio

Continuation-in-part of Ser. No. 778,794, Mar. 18, 1977, Pat. No. 4,116,339. This application Sep. 6, 1978, Ser. No. 940,075
Int. Cl.[2] B07C *1/00*; A01D *33/02*
U.S. Cl. 209—699 **34 Claims**



1. Sorting apparatus for objects exhibiting identifiable dynamic response to vibrational phenomena comprising:

means for introducing a quantity of said objects at the entrance location of a sorting zone extending along a given longitudinal axis to an exit location;

means defining an oscillatory surface within said zone and extending along said longitudinal axis;

drive means including a dynamically balanced rotative drive member actuable to impart oscillation of predetermined frequency and amplitude characteristics to said oscillatory surface;

transporter means including a plurality of regularly-spaced parallel carrier components pivotally interconnected in endless chain-like fashion to define a conveyor within said zone extending from said entrance location in parallel relationship with said longitudinal axis, each said carrier component having an upwardly disposed support surface when within said zone extending outwardly from a location adjacent said oscillatory surface at a predetermined angle of inclination with respect to horizontal, said spacing being selected to provide a two position support for said objects upon adjacent said support surfaces while moving them within said zone in orientations promoting the kinetic reaction thereof with said oscillatory surface;

means adjacent said zone for receiving reacted said objects exhibiting predetermined dynamic response characteristics to said kinetic reaction; and

means for simultaneously actuating said drive means and said transporter means.

4,176,751
CONTAINER APPARATUS FOR HANDLING SEMICONDUCTOR WAFERS

Michael J. E. Gillissie, Kanata, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Jan. 27, 1977, Ser. No. 762,862
Int. Cl.[2] A47G *19/08*; B65B *21/02*
U.S. Cl. 211—41 **1 Claim**

1. Apparatus for transferring semiconductor wafers, comprising:

a holder of trough shaped cross-section including two opposed parallel sides having top and bottom surfaces;

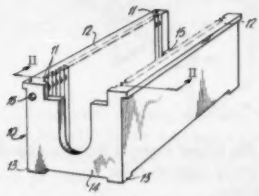
said top surfaces being flat and including locating means for cooperation with locating means on a further member;

said sides joined at one end by an end wall extending between said sides at said one end and joined at the other end by a bar extending between said sides at said other end, the holder open at top and bottom between said end wall and said bar;

a plurality of parallel Vee shaped grooves formed in an inner surface on each side, the grooves extending from said top surfaces and having inwardly inclined lower ends extending in to the inner surface of the side at a position intermediate the top and bottom surfaces, for reception and retention of a semiconductor wafer in each opposed pair of grooves when said holder is in an upright position, at least a major portion of each wafer below said top surfaces;

a hole extending longitudinally through one side of the holder adjacent to the top surface thereof, the periphery of the hole extending into the Vee grooves at a position above that occupied by a portion of the wafer; and

a rod slidable axially into and out of said hole;



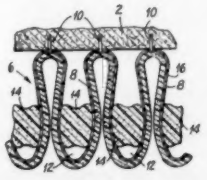
the arrangement such that the rod, when inserted into said hole, extends over the periphery of the wafers at a position remote from the centres thereof to retain the wafers in the holder when said holder is in an inverted position, with the edges of the wafers unobstructed for alignment and prepositioning with respect to grooves of said further member;

said further member including a plurality of Vee-shaped grooves aligned with said Vee-shaped grooves in said holder for reception of wafers therein, a wafer in each groove.

4,176,752
RACK AND GOLF CART

Russell E. Taber, 46 Crystal Cir., Ormond Beach, Fla. 32074

Division of Ser. No. 798,102, May 18, 1977. This application Jun. 21, 1978, Ser. No. 917,504
Int. Cl.[2] A47B *81/00*
U.S. Cl. 211—120 **5 Claims**



1. A resilient rack device comprising:

a base member;

a strip of flexible resilient plastic material secured to said base member at spaced points, the material of said strip between said spaced points defining resilient elongated parallel loops extending outwardly from said base, adjacent loops being sufficiently close together to conform to and frictionally receive and hold an article therebetween; and

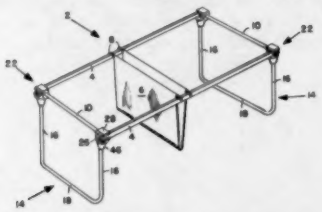
a separate body of resilient foam material in each of said loops holding said loops yieldably expanded toward adjacent loops.

4,176,753

HANGING FILE SUPPORT FRAME

Steven W. Godfrey, Florence, Ky., assignor to Hunt Manufacturing Co., Philadelphia, Pa.

Filed Aug. 9, 1978, Ser. No. 932,263
Int. Cl.[2] A47F 5/10
U.S. Cl. 211—182 3 Claims



1. A hanging file folder support frame comprising:
a pair of file folder support rails,
four corner fittings,
legs supporting the corner fittings in an elevated position,
each corner fitting having a bottom wall, a rear wall, and a flexible top wall forming a first opening for the reception of one end of a rail, the top and bottom walls forming a front entry into said first opening for the passage of said one end of a rail into said first opening in a direction transverse to the length of the rail, said rear wall being substantially thicker than the top wall, and the top wall being cantilevered from the rear portion of the rear wall,
means integral with the top and bottom walls of each corner fitting for releasably locking the rail end into the first opening,
a pair of transverse members each having hollow ends,
the rear wall of each corner fitting having a second opening therethrough for the reception of one end of a transverse member, and
a rail backing wall in said first opening of each corner fitting depending from the top wall and having a boss extending towards the second opening in the rear wall and received in the hollow end of a transverse member for restraining the movement of the depending wall and the top wall to prevent inadvertent disengagement of a rail end from the corner fitting.

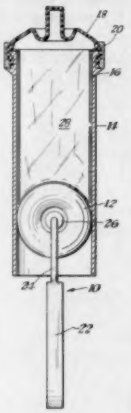
4,176,754

PNEUMATIC BIASING DEVICE FOR PREVENTING AIR FROM ENTERING A NURSING BOTTLE

Diane Miller, 2241 NE. 34 Ct., Lighthouse Point, Fla. 33064

Filed Jun. 23, 1978, Ser. No. 918,409
Int. Cl.[2] A61J 9/00
U.S. Cl. 215—11 E 1 Claim

1. A device for preventing air from being received into the flexible bag in a conventional nursing bottle, comprising:
a pneumatic biasing means, said pneumatic biasing means being sized to be frictionally engaged in the inside of a conventional nursing bottle;
a means connected to the biasing means for manually positioning the biasing means within said nursing bottle;



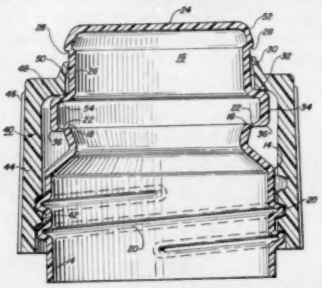
said pneumatic biasing means being donut-shaped and having an outer diameter which is slightly greater than the inner diameter of a conventional nursing bottle.

4,176,755

RESEALABLE POUR BOTTLE WITH SEVERING RING

David A. Winchell, Twin Lakes, Wis., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Jan. 26, 1979, Ser. No. 6,977
Int. Cl.[2] B65D 1/02
U.S. Cl. 215—32 5 Claims

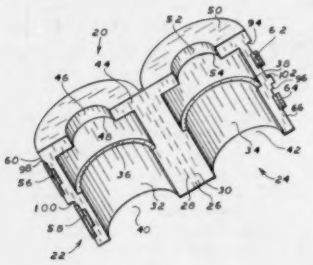


1. A resealable container for storing and dispensing liquids, said container including a neck defining a dispensing outlet and a cap covering said outlet, a frangible section coupling said cap to said neck, the improvement comprising:
said cap having an outwardly extending retaining abutment and an outwardly extending bearing surface spaced downwardly from said retaining abutment;
said neck carrying external threads; and
an outer ring having internal threads for threaded engagement with the external threads of said neck, said outer ring having a plurality of inwardly extending slightly flexible fingers for fitting around the cap intermediate said retaining abutment and bearing surface, whereby downward rotation of said outer ring will force said outer ring against said bearing surface thereby severing the cap from the neck at the frangible section and upper rotation of said outer ring will place said fingers into engagement with said retaining abutment.

4,176,756
STOPPER LOCK FOR CULTURE BOTTLE

Barry N. Gellman, Wayne, N.J., assignor to Becton, Dickinson and Company, East Rutherford, N.J.

Filed Jun. 27, 1977, Ser. No. 809,972
Int. Cl.[2] B65D *45/32*
U.S. Cl. 215—274 8 Claims



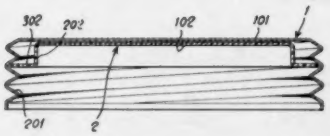
1. A stopper lock adapted for application to a culture bottle in position to retain the stopper on the culture bottle comprising; a pair of lock halves, fastener means on the lock halves, the lock halves having a configuration permitting their placement on the bottle to engage with the stopper and bottle and to lock the stopper in position in the bottle when the fastener means couples the lock halves together while permitting access to the stopper, the lock halves being hinged together along one adjoining edge to facilitate their positioning on the bottle and stopper in the open position and then rotated into the closed position to lock the stopper in position on the bottle, the fastener means being located on the edge of each half opposite to the hinged edge, the fastener means including at least one laterally extending projection extending from the free edge of one body half, the projection having a narrow free end portion extending into a wider portion terminating in a longitudinal shoulder, at least one receiving slot positioned on the longitudinal edge of the other body half distal from the hinged end and having a size permitting insertion of the lateral projection therein until the projection snaps into position with the shoulder engaging the end wall of the slot thereby locking the lock halves together, the fastener means including permanent lock means to prevent reopening of the stopper lock after it has been closed and thereby providing a one time use stopper lock, the permanent lock means including each laterally extending projection extending from the free edge of one body half having a beveled portion between the narrow free end and the longitudinal shoulder and the opposite side of the shoulder from the beveled portion forming a wall, and each at least one receiving slot being formed by a tapered slot adjacent the longitudinal edge of the other body half and tapering between a wider lateral opening to a narrow opening at the point of the slot distal from the longitudinal edge and a guide bar on the longitudinal edge of the other body half and spaced from the lateral wall forming the entrance to the slot thereby providing an opening therebetween for introduction of the projection, the rear side of the bar forming a wall for interengagement with the wall on the longitudinal shoulder of the projection when the projection is inserted in the slot and to cooperate with the remainder of the slot to retain the projection in locked position therein.

4,176,757
GASKET FOR CLOSURE CAPS FOR CONTAINERS

Armando Podesta, 36, Corso Buenos Aires Milan, Italy

Filed May 1, 1978, Ser. No. 901,695
Claims priority, application Italy, May 2, 1977, 12584 A/77
Int. Cl.[2] B65D *53/00*
U.S. Cl. 215—341 2 Claims

1. In a closure for containers comprising a closure cap having a disc portion, a skirt depending from the periphery of the disc portion, means for fastening said skirt to the neck of a container to be closed, and a gasket disposed adjacent said disc portion of the closure cap for sealing contact with a rim of a neck of a container to be closed, the improvement wherein said gasket is made of a thin foil of plastics material and has a disc portion adjacent the disc portion of said closure cap, a cylindrical skirt portion depending from the periphery of said disc portion and a flange portion extending radially outwardly from

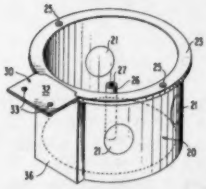


the lower end of said skirt portion, whereby as the gasket is compressed between said closure cap and a rim of a neck of a container, said skirt portion will flex inwardly in a bellows-like manner thereby providing three layers of gasket material between the rim and the closure cap, said three layers being formed by said flange portion, said cylindrical skirt portion, and said disc portion.

4,176,758
UNIVERSAL ELECTRICAL OUTLET BOX AND METHOD OF INSTALLING

Earl Glick, 13015 Lincoln St., NW., Massillon, Ohio 44646

Division of Ser. No. 803,364, Jun. 3, 1977, Pat. No. 4,096,964.
This application Apr. 17, 1978, Ser. No. 897,182
Int. Cl.[2] H02G *3/08*
U.S. Cl. 220—3.3 8 Claims



1. An electrical outlet box molded from plastics material and having a rear wall and a substantially cylindrical side wall, the outlet box being open forwardly, a screw-threaded metallic post centrally located in the outlet box axially thereof and concentric with said cylindrical side wall, anchor means on one end of said post embedded in said rear wall and integrally connecting said post to said rear wall, said post terminating in said rear wall, a flat faced bearing pad formed on the cylindrical side wall at one locality thereof and constituting a thickened portion of the cylindrical side wall, and having an exterior flat face parallel to the axis of the side wall and post, and a metallic mounting bracket for the outlet box including an apertured attaching web flush with the forward end of the box and projecting radially thereof normal to the axis of the side wall and post and a substantially flat anchor web moldably embedded integrally in the side wall adjacent said bearing pad, said apertured attaching web being normal to said flat face of the bearing pad.

4,176,759

ELECTRICAL OUTLET BOX

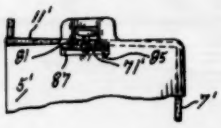
William Nattel, Montreal, Canada, assignor to GTE Sylvania Canada Limited, Montreal, Canada

Division of Ser. No. 761,473, Jan. 24, 1977. This application Feb. 23, 1979, Ser. No. 14,511

Claims priority, application Canada, Dec. 17, 1976, 268114

Int. Cl.[2] H02G *3/08*

U.S. Cl. 220—3.94 3 Claims



1. An electrical outlet box comprising a spacer member and two side walls, the spacer member having a back wall and a pair of end walls which extend from the ends of the back wall and diverge slightly from each other, first means for connecting one end of each side wall to one end wall; second means for connecting the other end of each side wall to the opposite end wall; the second connecting means having third and fourth cooperating means on the side wall and opposite end wall respectively for camming the end walls to a substantially parallel position and means on said connecting means for locking the third and fourth means together with the end walls in the substantially parallel position, said third cooperating means comprises an opening in the side wall, the opening having a camming surface on one side thereof, the fourth cooperating means comprising a tab projecting from the opposite end wall, the tab insertable into the opening where it can be cammed by the cam surface toward said one end wall.

4,176,760

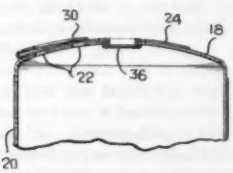
EASY OPENING CONTAINER UNIT HAVING A DOMED END PANEL

Donald J. Roth, Chicago Heights, Ill., assignor to The Continental Group, Inc., New York, N.Y.

Filed Dec. 8, 1978, Ser. No. 967,763

Int. Cl.[2] B65D *41/00*

U.S. Cl. 220—359 9 Claims



1. An easy opening container unit comprising a domed end panel having an area of maximum projection, permanently formed dispensing opening means in said domed end panel, and a displaceable pull tape temporarily sealing said dispensing opening means, said pull tape extending beyond said dispensing opening means and over and byond said area of maximum projection.

4,176,761

THERMALLY INSULATED VESSEL ESPECIALLY FOR LIQUEFIED GASES

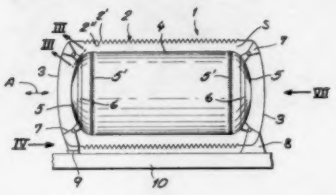
Horst Göbl, Garching, Fed. Rep. of Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Filed Dec. 2, 1975, Ser. No. 636,964

Claims priority, application Fed. Rep. of Germany, Dec. 4, 1974, 2457264

Int. Cl.[2] B65D *81/18, 87/24*

U.S. Cl. 220—438 3 Claims



1. An insulated vessel for the storage or transport of liquefied gas comprising:

an inner axially elongated generally cylindrical receptacle receiving said liquefied gas;

an outer axially elongated generally cylindrical receptacle spacedly surrounding said inner receptacle and defining an evacuatable space therewith, said outer receptacle comprising at its ends a pair of opposing shell members and an intermediate member sealingly connected to said shell members and disposed between the shell members, said intermediate member being formed unitarily with stiffening formations preventing radial expansion and contraction but permitting elastic axial expansion and contraction; and

support elements engaging said shell members and supporting said outer receptacle on said inner receptacle, said shell members being formed as dome cylinder bottoms and said intermediate member being a cylindrical wall, said formations extending circumferentially on said wall, said wall being corrugated with the corrugations having crests and troughs lying in planes perpendicular to the axis of said outer receptacle, said inner receptacle having cylinder bottoms at opposite ends thereof, said support elements being rigidly connected to said cylinder bottoms of said inner receptacle.

4,176,762

DRIVE SYSTEM FOR ROTARY MERCHANDISE CARRIERS

Frank T. Scalera, 12 Bowdoin St., Maplewood, N.J. 07040, and Merrill Krakauer, 1 Deer Path, Short Hills, N.J. 07078

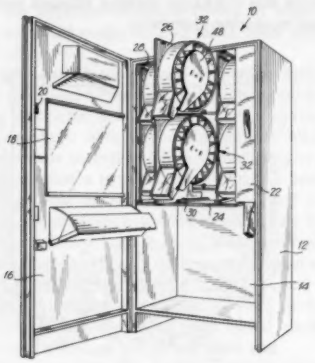
Filed Jul. 19, 1978, Ser. No. 926,001

Int. Cl.[2] G07F *11/00*

U.S. Cl. 221—81 10 Claims

1. In a merchandising machine having a plurality of merchandising units each of which includes a display escrow assembly adapted to be actuated to deliver an article held thereby and a rotary merchandise carrier provided with a plurality of storage compartments and adapted to be driven to position a compartment thereof adjacent to said escrow assembly to which an article can move out of said storage compartment and means responsive to rotation of said carrier for actuating said escrow assembly and a product pusher adapted to be moved into a compartment positioned adjacent to said escrow means, an improved drive system including a plurality of sliders, means mounting said sliders adjacent to the respective carriers for movement with an upward stroke and with a return stroke, respective drag links carried by said sliders, an element on each of said links adapted to engage its associated carrier to rotate the same and to operate the corresponding

pusher, means for constraining an element to move along a first path in which it successively rotates its associated carrier and operates its associated pusher in the course of the upward movement of the corresponding slider and to move along a second path in which it ensures return of its associated pusher and clears its associated carrier in the course of the return



movement of the corresponding slider, a drive member, means mounting said drive member for vertical linear reciprocating movement adjacent to said sliders, normally inoperative interengageable means on said sliders and on said member, means for selectively rendering said interengageable means operative, and means for driving said member with a dwell between the time said carrier rotates and said pusher is actuated.

4,176,763

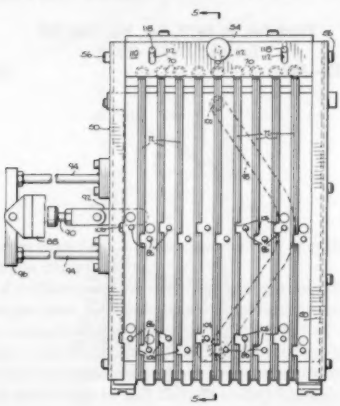
MAGAZINE FOR TRANSFERRING ROD-SHAPED ARTICLES

Charles J. Klara, Bethlehem; James H. Hohl, Wescoesville, both of Pa., and Wilbur L. Clymer, Phillipsburg, N.J., assignors to Binney & Smith Inc., Easton, Pa.

Continuation-in-part of Ser. No. 738,489, Nov. 3, 1976, abandoned. This application Oct. 31, 1977, Ser. No. 846,896

Int. Cl.[2] B65H *3/40*

U.S. Cl. 221—93 **13 Claims**



1. A magazine for receiving elongate similar articles from a source retaining said articles in a predetermined parallel array and for transferring said articles to a collector in unscrambled parallel relation with one another, said magazine comprising:

(a) partition means defining a plurality of open-bottomed chambers adjacent to, but isolated from, one another, each of said chambers corresponding in width to the width of any of said articles so that the associated partition means thereby provide loose lateral support for a selected number of said articles in a stacked array, with one said article upon the next;

(b) support means movably disposed in each of said chambers for releasably supporting each said stacked array against free gravitational fall; and

(c) control means operatively associated with said support means for withdrawing all said support means simultaneously with one another from their respective chambers and for thereby releasing each said stacked array for free gravitational fall through the open bottom of its respective one of said chambers.

4,176,764

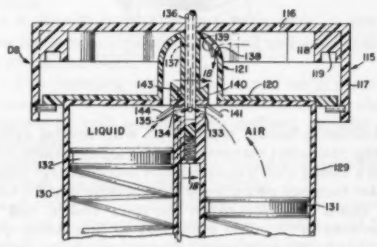
MECHANICALLY OPERATED MIXING DISPENSER HAVING A PLURALITY OF EXPANSIBLE CHAMBERS AND A PLURALITY OF ACCUMULATING CHAMBERS

Nicholas G. Capra, East Hanover, N.J., and Ronald L. Antenore, Coral Gables, Fla., assignors to James D. Pauls, Ltd., Miami, Fla.

Division of Ser. No. 729,830, Oct. 5, 1976. This application Apr. 26, 1978, Ser. No. 900,323

Int. Cl.[2] B05B *11/02*

U.S. Cl. 222—135 **4 Claims**



2. A mixing dispenser, comprising:

a container for material to be dispensed;

a dispensing device carried by the container and including first manually operable means accessible exteriorly of the container;

expansible accumulating chamber means carried by the dispensing device for receiving and storing under pressure a quantity of material to be dispensed and comprising a pair of cylinders and a piston reciprocable in each cylinder;

expansible charging chamber means carried by the dispensing device and comprising a pair of cylinders and a piston reciprocable in each cylinder, one of the charging chamber cylinders being in communication with one of the accumulating chamber cylinders, and the other of said charging chamber cylinders being in communication with the other of the accumulating chamber cylinders, valve means connected between the cylinders, whereby said one accumulating chamber cylinder is charged from said one charging chamber cylinder and the other accumulating chamber cylinder is charged from the other charging chamber cylinder, said charging chamber cylinders each being in communication with a different material, whereby each accumulating chamber cylinder is charged with a different material, said expansible charging chamber cylinders each having a smaller cross-sectional area transverse to the longitudinal axis than the expansible accumulating chamber cylinders and repeatedly operable to incrementally introduce quantities of material into the accumulating chamber cylinders to incrementally charge the accumulating chamber cylinders with an amount of material to be dispensed; and

second manually operable means connected with the accumulating chamber cylinders to effect prolonged, pressur-

ized discharge of material from the accumulating chamber cylinders.

4,176,765

SELF-CLEANING BUCKET WHEEL LOCK

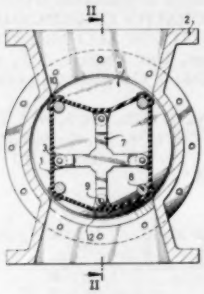
Ursus Thümmler, Erftstadt; Hugo Werner, Hurth-Hermulheim, and Harry Sander, Sindorf, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Feb. 9, 1978, Ser. No. 876,250

Claims priority, application Fed. Rep. of Germany, Feb. 12, 1977, 2706047

Int. Cl.[2] G01F *11/00*

U.S. Cl. 222—218 **10 Claims**



1. Self-cleaning bucket wheel lock with several cells for introducing coalescent material into a closed apparatus, which comprises a casing with a material inlet and discharge outlet; a rotor basket mounted on a driving shaft passing into the casing; a closed elastic hose forced on the rotor basket, said hose having secured to its inside a plurality of lugs being spaced apart from each other; a star with several arms being arranged in the interior of said hose and being connected to the lugs of said hose; and a shaft passing into the casing at its side opposite the driving shaft and extending through the casing so as to provide a rigid connection to the center of said star, said shaft being displaced eccentrically with respect to the driving shaft so as to be spaced therefrom at a separation e, whereby said hose permits the volume of each cell to be varied whenever the driving shaft is caused to rotate.

4,176,766

SOUP DISPENSER

John B. West, Glyndon, Md., assignor to Maryland Cup Corporation, Owings Mills, Md.

Continuation-in-part of Ser. No. 827,678, Aug. 25, 1977. This application Nov. 16, 1977, Ser. No. 851,950

Int. Cl.[2] G01F *11/20*

U.S. Cl. 222—238 **30 Claims**

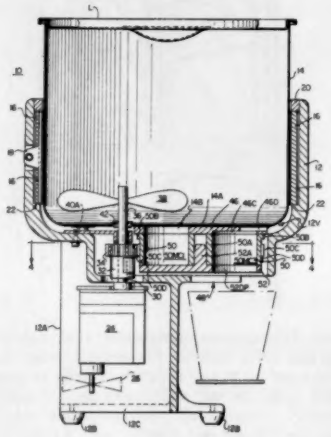
1. A dispensing assembly for dispensing volumes of liquid or semi-liquid food product from the bottom of a reservoir by gravity filling and emptying, comprising:

a rotary dial shaped transfer plate means having a circular pattern of substantially identically configured measuring chambers formed therein and extending therethrough parallel to a central axis of rotation;

a conformal housing for said transfer plate means open at its top and having a supporting plate across the bottom thereof coextensive with said transfer plate means, said supporting plate having a discharge opening formed therein of substantially identical configuration as said measuring chambers for successive registry therewith in response to rotations of said transfer plate means on said central axis of rotation within said housing;

sealing plate means fixed from rotation on said housing over said transfer plate means and overlying an area on said transfer plate means coincident with the said discharge opening and surface areas adjacent thereto and greater than the cross-sectional area of a said measuring chamber and having an intake port formed therein in registry with successive ones of said measuring chambers during rotation of said transfer plate;

said sealing plate means including vent port means in registry with said discharge opening through successive ones of said measuring chambers;



motor means having a rotary output shaft mounted for rotation adjacent said transfer plate means in said housing; and

drive means selectively actuated to interconnect said output shaft with said transfer plate means for rotating the latter in an amount to register a predetermined number of measuring chambers with said discharge opening for each selective actuation of said drive means.

4,176,767

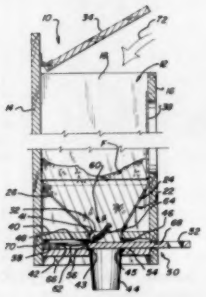
DOG FOOD DISPENSER

Darius C. Franche, IV, 1401 W. Wabansia Ave., Chicago, Ill. 60622

Filed Jan. 5, 1977, Ser. No. 756,785

Int. Cl.[2] B65D *47/26*

U.S. Cl. 222—243 **17 Claims**



1. In apparatus for storing and dispensing dry pellet-like food particles in which a storage bin has a hopper bottom with an outlet hole at its lower extremity for allowing food particles to flow out of said bin, the improvement comprising:

a slidable gate traversing said outlet hole in said hopper bottom for regulating the flow of food particles out of the bin, said gate having an elongated generally rectangular

body and provided with a handle at one end, a solid center section, and an opening at its opposite end such that sliding said gate longitudinally in one direction results in aligning said solid center section with said outlet hole for effectively closing said outlet hole to preclude flow of food particles from said bin and sliding said gate longitudinally in the opposite direction results in aligning said opening with said outlet hole to allow food particles to flow out of the bin;

an upper plate sealed against and extending both in one direction from said outlet hole and in the opposite direction from said outlet hole, said upper plate having a hole therein concentric with said outlet hole to allow food particles to flow therethrough, a lower plate in parallel spaced-apart relation to said upper plate, said lower plate also having a hole therethrough axially aligned with said outlet hole, wiper means extending downwardly from said upper plate adjacent said hole in said upper plate for wiping any food particles on the upper surface of said gate into said opening as said gate is slidably moved open or closed thereby preventing build-up of food particles between said gate and said upper plate which could otherwise inhibit free movement of said gate; and

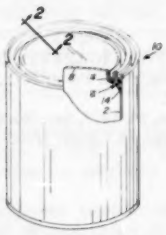
agitator means on said sliding gate extending upwardly through said outlet hole into said bin for agitating the food particles in the immediate vicinity of said opening as said gate is slidably moved in either direction to encourage removal of the food particles from said bin as said gate is advanced to align said opening with said hole.

4,176,768

PAINT CAN CORNER FILLER

John C. Ritter, 12645 Duchess, Detroit, Mich. 48224

Filed Jun. 22, 1978, Ser. No. 917,913
Int. Cl.[2] B67D *3/00*
U.S. Cl. 222—564 **2 Claims**



1. A corner filler for the inside corner of the openable end of liquid carriers comprising:

a ring of resiliant material said ring having an outside diameter larger than the inside diameter of said carrier to sealingly engage said inside diameter, one end of said ring having a thickness and shape approximating the space between the inside wall of said carrier and the inside wall of the outer edge of said carriers sealing lip, and is snugly received therein, the inside wall of said one end following the contour of said space axially toward the other end and radially inward, terminating in a circular sharp edge when the bottom of said sealing lip is half covered radially;

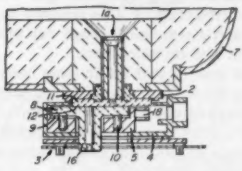
said outside diameter extends axially from said one end for approximately two times the depth of said sealing lip terminating in an oblique corner at said other end, said oblique corner and said circular sharp edge are connected by a slightly concave surface.

4,176,769

FLUTED,-STEPPED, POUR NOZZLE

Joseph W. Cudby, Sheffield, England; Christopher F. King, and Nicholas Syred, both of Cardiff, Wales, assignors to USS Engineers and Consultants, Inc., Pittsburgh, Pa.

Filed Mar. 22, 1978, Ser. No. 888,904
Claims priority, application United Kingdom, Apr. 7, 1977, 14724/77
Int. Cl.[2] B22D *41/08*
U.S. Cl. 222—591 **13 Claims**



1. A flow nozzle for use in the pouring of molten metal comprising:

(a) a hollow body having an inlet opening at one end, a discharge opening at the other end and a metal flow passage therebetween;

(b) a flow impeding constriction in said metal flow passage formed by a substantially annular shoulder about the interior of said hollow body defining an inlet section thereabove;

(c) means forming a duct between said flow impeding constriction and said discharge opening;

(d) a plurality of circumferentially spaced, elongated fins in the inlet section of said metal flow passage, said fins projecting inwardly from the wall of said body and extending generally parallel to the direction of metal flow through said passage; and

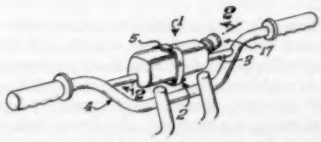
(e) the upstream ends of said fins being longitudinally spaced from said inlet opening and forming abruptly bluff, inwardly projecting steps providing a substantially annular shoulder about the interior of said hollow body for obstructing the passage of recirculatory currents in the metal flow from entering said duct.

4,176,770

MOTORCYCLE CANTEEN

William K. Griggs, Torrance, Calif., and Harry Holland, Las Vegas, Nev., assignors to Tumbleweed Enterprises, Torrance, Calif.

Filed Aug. 28, 1978, Ser. No. 937,477
Int. Cl.[2] B62J *7/00*
U.S. Cl. 224—30 A **17 Claims**



1. In a canteen assembly adapted for mounting on the crossbrace of the handlebars of a motorcycle, the improvement consisting of:

(a) a bracket, including clamping means at the left and right ends thereof securing it to said crossbrace,

(b) support means on said bracket for supporting a canteen and, including a rectangular, horizontal, top face bounded by front, rear, left and right edges,

(c) depending from said front and rear edges, respectively, are front and rear rectangular faces the top edges of each being inclined inwardly at an angle of about 10° from vertical,

(d) loop means depending from the bottom edge of said front and rear rectangular faces, respectively, adapted to receive and retain a holding strap,

(e) a length of holding strap threaded through said loop means, said holding strap being provided with securing means at each end for adjustably securing one end to the other end,

(f) said canteen consisting of a bottle main body bounded by 6 walls: top, bottom, front, rear, left and right walls, a threaded neck emerging from the right wall, terminating in a mouth surrounded by a lip sealably engageable with gasket means of a removable screw cap closure engaging the threads of said threaded neck,

(g) said bottom wall of said bottle main body being deeply creased inwardly to form a longitudinal groove traversing the entire length of said main body in sufficient depth and width that the crossbrace of said handlebars can be completely received by said longitudinal groove,

(h) a 2-level cavity depressed into the mid-section of said groove, shaped and dimensioned in its medial deeper level portion to intimately engage said top face and to wedgingly engage said inclined front and rear rectangular faces; two lateral shallower level portions, positioned left and right of said medial deeper level portion, having a depth and diameter sufficient to clear said clamping means at the left and right ends, respectively, of said bracket when said canteen is straddlingly mounted over said bracket which is securely clamped to said crossbrace, and

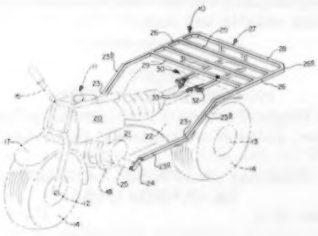
(i) said holding strap being snugly wrapped around the midsection of said canteen and each of its ends secured one to the other, thereby securing the canteen assembly to the crossbrace of the motorcycle.

4,176,771

CARRIER FOR THREE-WHEEL MOTORCYCLE

Tyrone P. Dubroc, Sr., 4583 Little Farms Dr., Zachary, La. 70791

Filed Jan. 9, 1978, Ser. No. 867,901
Int. Cl.² B62J 7/04
U.S. Cl. 224—39 **9 Claims**



1. A carrier assembly for attachment to a motorcycle having a front wheel and two opposed rear wheels, and having a frame and a pair of opposed foot rests fixedly coupled to the lower portion of said frame, said assembly comprising:

(a) a pair of opposed, spaced apart, upwardly and rearwardly extending leg members, the lower ends thereof being adapted for coupling to said pair of opposed foot rests, said leg members being spaced outwardly of said motorcycle to provide space for the rider's legs therebetween;

(b) a generally U-shaped article support section having a pair of spaced apart side members attached to the upper ends of said leg members and extending toward the rear of said motorcycle and article support means extending between said side members;

(c) brace means attached to an upper part of said frame at one of its ends and attached at one or more points to said U-shaped article support section; and

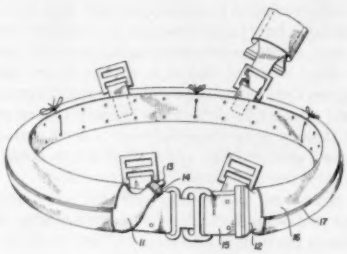
(d) said carrier assembly being free of any attachment to the rear wheels of said motorcycle.

4,176,772

WATER CONTAINER

David Danon, Rehovot, Israel, assignor to Yeda Research & Development Co. Ltd., Rehovot, Israel

Filed Jul. 5, 1977, Ser. No. 812,910
Claims priority, application Israel, Jul. 5, 1976, 49974
Int. Cl.² A45F 3/20
U.S. Cl. 224—148 **7 Claims**



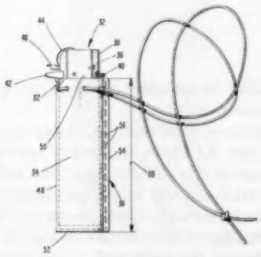
1. A water container comprising: a disposable tubular water-impervious flexible member adapted to contain hermetically sealed therewithin a supply of water, said tubular water-impervious member being substantially the length of a belt; belt means to support said tubular water-impervious flexible member, said belt means comprising a flexible elongated sheathing means having two ends, whereby said sheathing wraps about said tubular flexible member when the same is juxtaposed thereto covering said tubular water-impervious member, means for attaching the sheathing when wrapped about said tubular water-impervious member, and means to attach said two ends together around a person's waist; said tubular water-impervious member being sealed at both ends thereof.

4,176,773

HOLDER FOR CIGARETTE LIGHTER

Elizabeth P. Wilkinson, High Point, N.C., assignor to Joseph Bostick, Estill, S.C.

Filed Jun. 28, 1977, Ser. No. 810,863
Int. Cl.² A45C 11/00
U.S. Cl. 224—205 **2 Claims**



1. A holder for a cigarette lighter, adapted to be suspended from the neck of a wearer, comprising: a leather sleeve, open at both ends, formed from a generally rectangular flexible sheet of leather, folded to align two opposite edges thereof, wherein portions of the sheet adjacent the aligned edges are stitched together along the aligned edges, to form said sleeve, said sleeve having a roughened inner surface and being dimen-

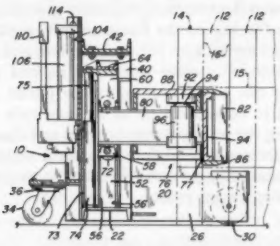
sioned to substantially cover a cylindrical butane tank and to permit the sleeve to receive and frictionally engage the lighter, so that the lighter is retained within the sleeve without providing a bottom end for the sleeve, and so that a portion of the lighter including an actuation member of the lighter protrudes beyond one of the open ends of said sleeve; and a strap, laced through a plurality of holes in said sleeve in the upper end of the sleeve, the ends of said strap being tied together to form a closed loop, said strap being of sufficient length to encircle the neck of the wearer to permit the lighter to hang loosely from the neck when the lighter is not in use and of sufficient length to permit the lighter to be manually grasped, actuated and positioned upright to light a cigarette in the mouth of the wearer.

4,176,774

COIL BREAKAWAY DEVICE

John W. Rogers, 22175 Douglas Rd., Shaker Heights, Ohio 44122

Filed Dec. 4, 1978, Ser. No. 966,432
Int. Cl.² B26F *3/00*
U.S. Cl. 225—103 **12 Claims**



11. Apparatus for detaching a wound coil from a horizontally disposed construct having an axial opening therethrough and including a plurality of axially spaced coils interconnected by frangible connections, said apparatus comprising:

(a) a base, open at one end for reception of said construct;

(b) a frame upstanding from said base;

(c) expandable mandrel means projecting from said frame of a size, when contracted, to be received within the axial opening of said construct, said mandrel including:

(i) anchor means vertically movable with respect to said frame;

(ii) means for moving said anchor means into engagement with the surface of said construct within said axial opening to anchor the same with respect to said mandrel.

(iii) radially displaceable means axially spaced from said anchor means adapted, when actuated, to impart a radial force against the surface of said construct opening of a magnitude sufficient to fracture the connections between adjacent coils; and

(iv) means for actuating said radially displaceable means.

4,176,775

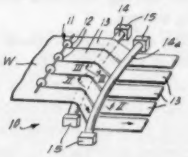
INHIBITING NOISE IN SHEET SPREADERS

Roger C. Brendemuehl, Beloit, Wis., assignor to Beloit Corporation, Beloit, Wis.

Filed Mar. 28, 1977, Ser. No. 782,065
Int. Cl.² B65H *17/32*
U.S. Cl. 226—7 **22 Claims**

1. A method of inhibiting noise in the operation of a sheet spreader of the type wherein just-slit web strips running at high speed are separated laterally by travelling in limited wrapping relation across curvate flotation zones on complementary spaced spreader bars with respect to which the web strips approach and leave tangentially, so that there are tangency angle areas between the bars and the strips outside of the flotation zones, said flotation zones being supplied with strip-lifting antifriction lubricating air layers between the flotation zones and the strips in the flotation zones, said method comprising:

effecting air layer distribution in said flotation zones;



ventilating said tangency angle areas between the bars and the running strips by supplying to the tangency angle areas a sufficient volume of ventilating air for delaying pressure decay in said tangency angle areas;

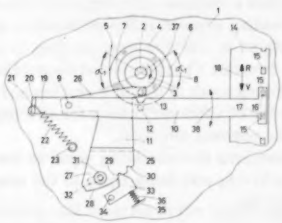
and thereby avoiding sudden tension fluctuations in the running strips and thus inhibiting noise generating vibrations in the running strips.

4,176,776

FILM-TRANSPORT MECHANISM FOR MOTION-PICTURE PROJECTORS, AND THE LIKE

Karl Ziegler, Nellingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Dec. 2, 1977, Ser. No. 857,043
Claims priority, application Fed. Rep. of Germany, Dec. 9, 1976, 2655821
Int. Cl.² G03B *1/22*
U.S. Cl. 226—51 **6 Claims**



1. An intermittent for motion-picture projectors and the like in which film is transported in forward and reverse directions along a predetermined path, the intermittent comprising, in combination,

a film transport claw provided with at least one film-perforation-engaging tooth;

means mounting the claw for movement in the direction of forward and reverse film transport and mounting the claw for movement in a direction transverse thereto for entry of the tooth into and withdrawal from film perforations;

rotary cam means coupled to the transport claw and operative for controlling movement of the claw in the forward and reverse film transport directions;

in-out control means operating in synchronism with the rotary cam means for controlling the movement of the claw in the direction of entry of the tooth into and withdrawal from film perforations, including means for selecting a forward-transport mode of operation establishing a forward-transport in-movement and a forward-transport out-movement and a reverse-transport mode of operation establishing a reverse-transport in-movement and a reverse-transport out-movement;

the rotary cam means comprising a rotating cam which

rotates in one and the same direction for both forward-transport and reverse-transport operation,

the rotating cam having one cam track which controls the movement of the claw in the film-transport direction for both the forward- and reverse-transport modes of operation,

the one cam track having first and secondary angularly spaced camming sectors,

the first sector being configured to cause the claw tooth to move in the stated order through a distance S_1 in the forward-transport direction, thereafter through a distance S_2 in the forward-transport direction, and thereafter through a distance S_3 in the reverse-transport direction,

the second sector being configured to cause the claw tooth to move in the stated order through a distance S_4 in the reverse-transport direction, thereafter through a distance S_5 in the reverse-transport direction, and thereafter through a distance S_6 in the forward-transport direction,

the forward-transport out-movement and the reverse-transport in-movement occurring subsequent to completion of the S_3 movement and prior to initiation of the S_4 movement,

the forward-transport in-movement and the reverse-transport out-movement occurring subsequent to completion of the S_6 movement and prior to initiation of the S_1 movement,

the S_2 movement constituting the one-frame film-advancement motion of the transport claw for forward film transport but constituting a part of the return stroke of the claw for reverse film transport,

the S_5 movement constituting the one-frame film-advancement motion of the transport claw for reverse film transport but constituting a part of the return stroke of the claw for forward film transport,

the claw, when a transport-effecting tooth thereof is engaging the leading edge of a film perforation and effecting film transport in one direction, needing to move in the opposite direction a predetermined distance before a transport-effecting tooth of the claw reaches and engages the leading edge of a film perforation for effecting film transport in the opposite direction,

said predetermined distance being equal to the sum of the distances S_3+S_4 and being equal to the sum of the distances S_1+S_6,

whereby:

during forward transport the S_1 movement is a movement in which the transport-effecting tooth of the claw is in a film perforation and moves into engagement with the leading edge of such perforation to commence the performance of the S_2 one-frame forward-transport motion,

during forward transport the S_3 movement is a movement in which the transport-effecting tooth of the claw is in a film perforation and moves out of engagement with the leading edge of such perforation preliminary to leaving such perforation,

during reverse transport the S_4 movement is a movement in which the transport-effecting tooth of the claw is in a film perforation and moves into engagement with the leading edge of such perforation to commence the performance of the S_5 one-frame reverse-transport motion,

during reverse transport the S_6 movement is a movement in which the transport-effecting tooth of the claw is in a film perforation and moves out of engagement with the leading edge of such perforation preliminary to withdrawing from such perforation.

4,176,777

SETTING ARRANGEMENT FOR ALIGNMENT AND GAP BETWEEN TWO RAIL ENDS

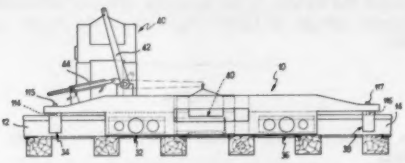
Patrick Bommart, Rueil-Malmaison, France, assignor to C. Delachaux, Gennevilliers, France

Filed Jul. 6, 1978, Ser. No. 922,347

Claims priority, application France, Jul. 8, 1977, 77 21157; Jun. 7, 1978, 78 17029

Int. Cl.[2] B23K *37/04*

U.S. Cl. 228—5.1 **13 Claims**



1. Apparatus for aligning and setting the gap between two rail ends prior to joining the two ends by fish plating or welding and eventual dressing of the weld, the apparatus comprising a rigid frame for overlapping the two rails and providing an access area around the two ends, two main presses and two end presses mounted in line on the frame and arranged so that the two main presses are located between the two end presses and each combination of a main press and an end press being adapted to grip one of the two rails to be joined, gap setting means adapted to be secured on to the two rails and having rams for moving the rails together or apart and dressing means for removing the weld bead formed after a welding joining operation and comprising a movable dressing tool displaceable by the gap setting means rams.

4,176,778

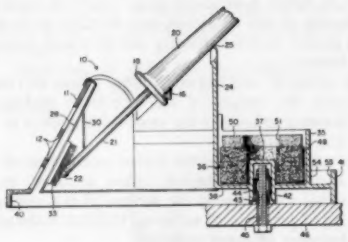
SOLDERING TOOL HOLDER

William S. Fortune, 14250 Dearborn St., Panorama City, Calif. 91402

Filed Feb. 27, 1978, Ser. No. 881,615

Int. Cl.[2] B23K *3/00*

U.S. Cl. 228—57 **15 Claims**



1. A holder for an electric soldering instrument of the character including a handle portion having an enlarged diameter retaining shoulder about the periphery of its forward end, a working shaft extending axially forwardly therefrom and terminating in a heatable tip element, said holder comprising:

a housing body having a lower portion for housing the working shaft and tip element;

said housing body having an upper portion including intermediate catch means for latching the retaining shoulder of the instrument handle portion to prevent retraction of the instrument from the lower housing portion;

said housing body further including an upper rest means for supporting the handle of the soldering instrument while allowing said handle to be lifted to disengage the catch from the retaining shoulder;

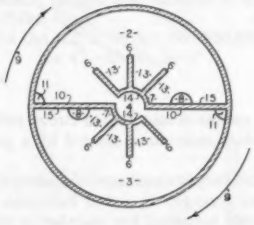
said housing body having an outer grill portion with perforated openings for the circulation of air therethrough; and a heat shield disposed spaced from and interiorly of said grill portion to provide a rest for the tip element of the instrument and to maintain said housing body at a temperature which can be readily touched by the hand of an operator.

4,176,779

HYDRAULIC INERTIA CENTRIFUGAL CATALYTIC DESALINATION DEVICE

Clair F. Kirk, 856 Pine St., Wheatland, Wyo. 82201, and Samuel A. Kirk, Box 65, Pringle, S. Dak. 57773

Filed Feb. 2, 1978, Ser. No. 874,709
Int. Cl.[2] B04B 5/04
U.S. Cl. 233—32 **1 Claim**



1. A device which is a centrifuge rotor with hydrogen gas pressure cavities which trap hydrogen gas to utilize the catalytic properties in the desalination of saline water, said rotor comprising a rotatable high gravity chamber, a first compartment shaft providing an inlet to said chamber, a second compartment shaft providing two compartment outlets to said chamber, said chamber comprising a cylinder arranged to rotate with said first and second shafts, said cylinder being positioned intermediate the inlet portion of said first shaft and the outlet portions of said second shaft, said cylinder sectioned into at least one separating pocket chamber by a wall, extending radially from cylinder center proximity to the circumference and joined to said cylinder internal ends and at the circumference, said wall providing a lagging and leading surface for said rotatable pocket, said first compartment shaft arranged to deliver pressurized mixture to the lagging surface of said pocket, a heavies separation fraction outlet positioned at the circumference end of said lagging surface, means for passing said heavies from said heavies to the first compartment of said second shaft, a heavies rotor outlet from said first compartment of said second shaft, numerous baffles joined at their axial ends and to said cylinder internal ends, extending radially toward the circumference of said cylinder providing hydrogen gas pressure cavities, said baffle adjacent said lagging surface providing a layer developing chamber, a lights separation fraction outlet positioned on the leading surface of said pocket on the arc of the peripheral ends of said baffles, means for passing said lights from said lights outlet to the second compartment of said second shaft, a lights rotor outlet from the said second compartment of the second said shaft.

4,176,780

METHOD AND APPARATUS FOR TESTING PRINTED CIRCUIT BOARDS

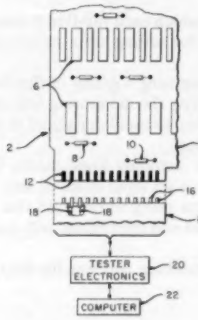
Eric Sacher, Phoenix, Ariz., and Thomas E. Trebelhorn, San Diego, Calif., assignors to NCR Corporation, Dayton, Ohio

Filed Dec. 6, 1977, Ser. No. 857,950
Int. Cl.[2] G06F 11/04; G01R 15/12
U.S. Cl. 235—302 **30 Claims**

1. A method of testing printed circuit boards having circuit connected electrical devices and input and response nodes, comprising the sequential steps of:

(A) evaluating and improving a test program for said boards by:
(1) applying the program to the input nodes of a printed circuit board, and obtaining from selected response nodes on said board a reference response pattern and reference toggle signatures,
(2) exercising the board to produce an arbitrary response pattern,
(3) applying the program to the board in said arbitrary response state, and obtaining a test response pattern from said selected response nodes,
(4) comparing said reference and test response patterns and, if a valid comparison is not obtained, modifying the program to obtain a valid comparison,
(5) faulting selected input nodes on the board,
(6) applying the program to the board with said selected nodes faulted, and obtaining test toggle signatures from selected response nodes while the program is applied, and
(7) comparing said reference and test toggle signatures to determine the penetration of said faults through the circuit board and, if the faults have not penetrated, modifying the program until penetration is established, and

(B) using said program to test printed circuit boards by:
(1) obtaining a reference response characteristic, by



(a) applying said program to the input nodes of a reference board, and
(b) for each of a plurality of selected response nodes on the reference board
(i) accumulating a running toggle signature number as the program is applied,
(ii) periodically sampling said number at a predetermined sampling rate, and
(iii) storing the samples thus obtained as a reference response characteristic, and

(2) analyzing a test board, by
(a) applying the program to the input nodes of the test board,
(b) for each of a plurality of selected test board response nodes corresponding to the selected response nodes on the reference board,
(i) accumulating a running toggle signature number as the program is applied, and
(ii) periodically sampling said number at sampling intervals corresponding to the sampling rate for the reference board, and
(c) comparing the test samples thus obtained with the corresponding stored reference samples to detect defects manifested by invalid comparisons between a test sample and its corresponding reference sample.

4,176,781
APPARATUS FOR MONITORING AND CHECKING PROCESSOR OPERATION SEQUENCES

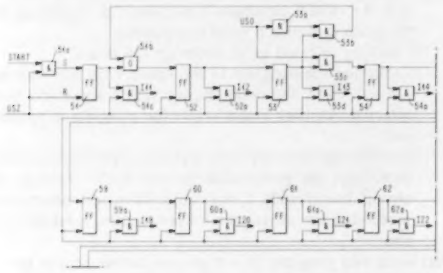
Jüergen Hüesing, Selent, and Hans H. Lampe, Herrenberg, both of Fed. Rep. of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 3, 1978, Ser. No. 892,455

Claims priority, application Fed. Rep. of Germany, Apr. 9, 1977, 2715983

Int. Cl.[2] G06F *11/00*

U.S. Cl. 235—304 **8 Claims**



1. Apparatus for monitoring and controlling sequence analysis of processor operations in an electronic digital computer, comprising:

a flip-flop chain in which each flip-flop is associated with an operational step for setting up a monitoring and check sequence;

a flip-flop ring, comprising a group of flip-flops within said chain for controlling the monitoring and check sequence;

means for conducting an oscillator signal to a reset input of all of said flip-flops;

said flip-flop chain including logic means for conducting control signals to a set input of all of said flip-flops;

each of said flip-flops being so designed that a concurrence of signals of the set and reset inputs will cause the flip-flop to change state;

said logic means permitting only one flip-flop to be set at any time;

storage means;

address generating means; and

means connected between said flip-flops and said address generating means, responsive to the concurrence of an oscillator signal and a set state of one flip-flop to cause said address generating means to generate the address in said storage means of a subroutine associated with said one flip-flop.

4,176,782
CONTACTLESS DIGITAL KEY SWITCH

Hiroshi Fukuda, Tokyo, and Haruo Matsuzaka, Yokohama, both of Japan, assignors to Matsu Kyu Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 1, 1978, Ser. No. 911,512

Claims priority, application Japan, Jun. 3, 1977, 52-72394[U]

Int. Cl.[2] G06K *7/08;* E05B *43/00, 35/00;* G06K *19/06*

U.S. Cl. 235—449 **3 Claims**

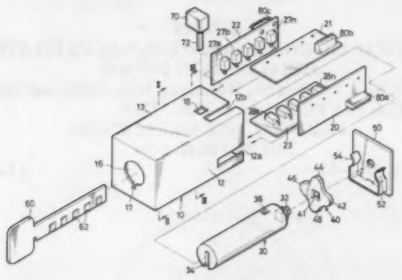
1. A contactless digital key switch comprising:

a plurality of printed circuit substrates each having a predetermined number of magnetic sensor chips longitudinally arranged thereon in spaced relation, said printed circuit substrates disposed in the form of polygon prism with said magnetic sensor chips facing inwardly;

an actuating key member having one or more permanent magnets longitudinally arranged therein in spaced relation and in coded form;

a rotary member adapted to receive said actuating key member and rotated with the same within said polygon prism defined by said printed circuit substrates; and

means drivingly connected to said rotary member for permitting rotation of said rotary member with a snap action and holding said rotary member in a position where said permanent magnets face to the corresponding magnetic



sensor chips on one of said printed circuit substrates every time said rotary member is rotated by a predetermined angle;

whereby a coded output signal corresponding to said permanent magnets arranged in coded form can be provided every time said actuating key member is turned by said predetermined angle.

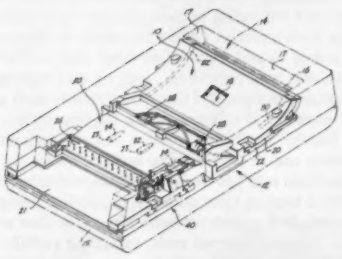
4,176,783
MANUALLY OPERABLE CARD READER INCLUDING COLUMN SENSOR

Helmut Eppich, West Vancouver, Canada, assignor to Ebco Industries, Ltd., Richmond, Canada

Filed Jun. 21, 1978, Ser. No. 917,644

Int. Cl.[2] G06K *7/14;* G08C *9/06*

U.S. Cl. 235—474 **18 Claims**



1. In combination with a manually operable card reader for reading coded data punches arranged in longitudinally-extending rows and transversely-extending columns on an elongated tabulation card, said manually operable card reader comprising a card guide means having defined therein first and second card openings and an elongated passageway having a pair of oppositely disposed major boundary surfaces and a pair of oppositely disposed minor boundary surfaces, said passageway being dimensioned for the passage of said tabulation card and interconnecting said first and said second card openings, and further comprising a card reading station for supplying a plurality of electrical signals representative of said coded data punches, said card reading station being positioned along said elongated passageway between said first and said second card openings and supplying said plurality of said electrical signals as said card is manually moved through said passageway;

a column sensor for providing an output signal related to the spacing of columns on said card as said card is moved through said passageway, said column sensor including:

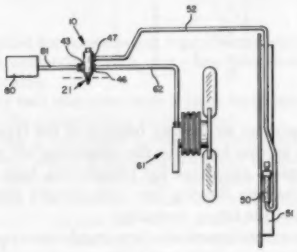
(a) a substantially cylindrical member having a circumferential surface;
(b) first means supporting said cylindrical member in proximity to said card reading station for rotation about an axis substantially transverse to the direction of elongation of said passageway, said first means being further adapted to resiliently urge said circumferential surface of said cylindrical member into contact with one of said pair of major boundary surfaces, and
(c) second means responsive to incremental rotation of said cylindrical member as a card is moved through said passageway for providing said output signal representative of the spacing of columns on said card.

4,176,784

DUAL ACTION CONTROL MECHANISM

Michael R. Ridenour, Angola, Ind., assignor to Evans Products Company, Portland, Oreg.

Filed Oct. 12, 1978, Ser. No. 950,838
Int. Cl.[2] G05D *23/02*
U.S. Cl. 236—86 **6 Claims**



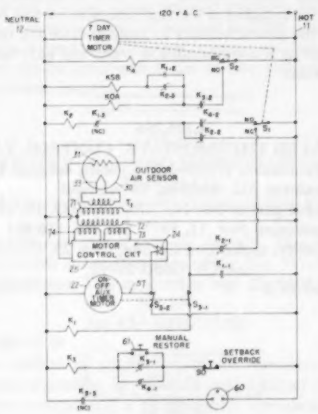
1. In a dual action control mechanism for supplying fluid under pressure to a first and a second fluid actuatable device having:
a. a valve body having an inner end and an outer end;
b. a valve chamber located within said valve body;
c. an opening in said valve body for communicating a source of fluid under pressure with said valve chamber;
d. an exhaust chamber communicating with the atmosphere located at the outer end of said valve body;
e. a connecting passageway communicating the valve chamber with the exhaust chamber;
f. a reciprocal valve rod located within said valve chamber, which said valve rod is reciprocally movable from a first position adjacent the inner end of said valve chamber to a second position removed from said inner end, a valve stem extending outwardly from said valve rod and into said connecting passageway, said valve stem having a passageway therein communicating said valve chamber with said connecting passageway in the first position of said valve rod;
g. a thermal sensor located at the inner end of said valve body, said thermal sensor having a push pin extending into the valve chamber and into contact with the inner end of said valve rod, said valve rod being in its first position when said push pin is unextended and in its second position when said push pin is fully extended;
h. a housing member located at the outer end of said valve body, said housing member having a bore communicating with said exhaust chamber, a reciprocal needle valve located and movable within said bore, said needle valve having a conical head portion at its inner end which extends through said exhaust chamber into sealing relationship with the outer terminus of said connecting passageway at the first position of said valve rod and into sealing relationship with the passageway of that portion of the valve stem extending into said connecting passageway at said second position of said valve rod, the bore of said housing member communicating with the atmosphere through a peripherally located exhaust port;
i. a first fluid passageway for communicating the valve chamber with a first fluid actuatable device; and
j. a second fluid passageway for communicating the connecting passageway with a second fluid actuatable device;
the improvement comprising:
an exhaust port communicating said valve chamber with the atmosphere; and
means for sealing communicating between said valve chamber and said first fluid passageway while said valve rod is in said first position, and means for sealing communication between said valve chamber and said exhaust port while said valve rod is in said second position.

4,176,785

AUTOMATIC TEMPERATURE CONTROLLER WITH NIGHT SETBACK AND OPERATING AS A FUNCTION OF OUTSIDE AIR

John J. Allard, Mishicot, and James R. Montz, Two Rivers, both of Wis., assignors to AMF Incorporated, White Plains, N.Y.

Filed Dec. 27, 1978, Ser. No. 946,229
Int. Cl.[2] F23N *5/20*; G05D *23/00*
U.S. Cl. 236—46 R **13 Claims**



1. In a temperature control system that maintains first temperature within a building during a first period of time and a second temperature within the building during at least a portion of a second period of time, wherein said periods of time repetitively follow each other, said system operating to automatically change said temperatures in an economical manner so that the temperature reaches said first temperature substantially at the time the first period begins, regardless of the characteristics of the outside air, wherein the system includes thermostat means for controlling the operation of a temperature changing controller means to maintain said first temperature within said building during said first period and said second temperature within said building during at least a portion of said second period, said system comprising
a first time scheduler continuously operable over a period of time that includes at least one first period and one second period,
an auxiliary timer,
said auxiliary timer being operable to run in a given direction from its beginning condition and to arrive again at its beginning condition after reaching a predetermined time indication,
auxiliary timer control means operable to control the running of the auxiliary timer,
sensing means for sensing a characteristic of air outside the building,
said sensing means being operably coupled to the auxiliary

timer control means for controlling the running of the auxiliary timer as a function of said sensed air characteristic,

means operable in response to said timer scheduler at the conclusion of the first period for actuating the thermostat means from a first to a second condition that will cause the temperature changing controller means to maintain said second temperature within the building during at least a portion of said second period,

auxiliary timer actuating means operable by said time scheduler at a predetermined number of hours before the next occurrence of the first period for initiating operation of the auxiliary timer under control of the auxiliary timer control means,

means operable in response to the running of said auxiliary timer to a given intermediate condition under control of said sensing means for operating said thermostat means to its first condition to control the building temperature at said first temperature,

means operable in response to said auxiliary timer when said intermediate condition has been reached for continuously running the auxiliary timer in said given direction independently of said sensing means and for stopping the auxiliary timer at its beginning condition,

means operable in response to said time scheduler after the thermostat means returns to its first condition for maintaining the building at the first temperature and for conditioning the time scheduler to again actuate the thermostat means to its second condition when the next occupancy period ends.

4,176,786

CONCEALED THERMOSTATIC CONTROL VALVE

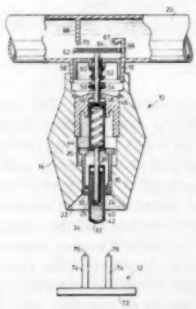
Heinz W. Braukmann, Willowdale, Canada, assignor to Braukmann Armaturen AG, Rothrist, Switzerland

Continuation-in-part of Ser. No. 777,115, Mar. 14, 1977. This application Nov. 11, 1977, Ser. No. 850,691

Claims priority, application Canada, Nov. 25, 1976, 266589

Int. Cl.[2] G05D *23/12*

U.S. Cl. 236—99 K **10 Claims**



1. A thermostatic control valve for regulating the supply of fluid through a conduit including in combination a valve plate and seal in said conduit, said valve plate having a valve stem extending outwards of said conduit, said valve stem having spring means exterior of said conduit to move said valve stem and plate away from said seal, a housing secured to said conduit, a retractable plunger in said housing operative on said valve stem, a casing for said plunger, means in said casing responsive to change in ambient temperature moving said plunger against said valve stem towards said seat, an interior member threaded in said housing, said interior member being wholly contained in said housing and having an outermost face adjacent an outer face of said housing, removable means engageable with said outermost face of said interior member to rotate same in said housing, said threaded interior member and casing being adapted for contact whereby rotation of said threaded interior member causes adjustment of the position of said plunger with respect to said seat.

4,176,787

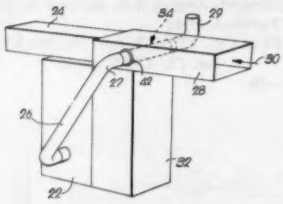
HEAT RECOVERY DEVICE FOR USE IN RETURN AIR DUCT OF FORCED AIR FURNACE

Fred J. Gary, R.F.D. #1, Box 164, Glasco, Kans. 67445

Filed Mar. 29, 1978, Ser. No. 891,171

Int. Cl.[2] F24B *7/00*

U.S. Cl. 237—55 **12 Claims**



1. For use with an air heating furnace of the type having a cool air intake section and a flue for conveying hot gases away from said furnace, apparatus for transferring heat from said gases to the cool air flowing into said furnace through said intake section of the latter, including:

a tubular member formed of a heat conductive material and provided with gas inlet and outlet openings at respective opposite extremities thereof,

said member being adapted to be coupled with said flue with said openings of the latter interposed between stretches of said flue,

said member having exterior surface areas thereof disposed within said intake section and in heat exchanging relationship to said cool air flowing through said section;

first means disposed within said member adjacent said surface areas of the latter for transferring heat from said gases to said surface areas of said member,

said first means including structure extending into the flowpath of said gases through said member between said openings in the latter, and being operative to deflect at least a portion of the flow of said gases through said member toward and into heat exchanging contact with interior surface portions of said member, but being operative to allow the remaining portion of said gases to flow thereby;

second means disposed within said member adjacent said surface areas of the latter for storing and transferring heat from said gases to said surface areas of said member,

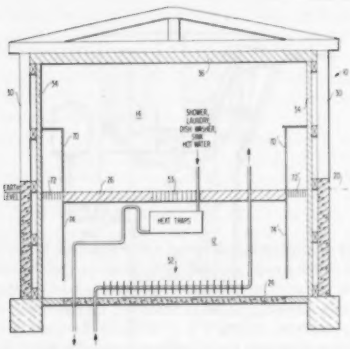
said second means including a gas pervious, heat conducting material generally positioned within said flowpath and allowing said gases to pass freely therethrough, portions of said material being in heat conducting contact with said interior surface portions of said member; and

third means disposed within said member adjacent said surface areas of the latter for transferring heat from said gases to said surface areas of said member,

said third means including elongate baffle means extending longitudinally within said member and having parts thereof in heat conducting contact with said interior surface portions of said member,

said baffle means presenting a substantial obstruction to the flow of said gas through said member for reducing the volume rate at which said gases flow through said member.

4,176,788
GEOTHERMAL HOME CONSTRUCTION
William P. Holman, P.O. Box 12, Ord, Nebr. 68862
Filed Apr. 12, 1978, Ser. No. 895,803
Int. Cl.[2] F24D *15/00*
U.S. Cl. 237—81 10 Claims



1. A method for constructing a geothermal structure having a basement, upstanding walls, and a first floor living area thereover comprising:

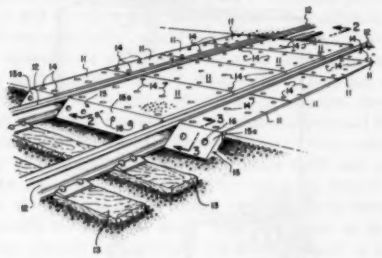
providing said basement with a floor level about seven feet below the surrounding ground level;

establishing a minimum ambient temperature within said basement which is approximately the temperature of the floor thereof by insulating the walls of said structure including the basement walls and insulating the ceiling over said living area but not to insulate or cover the floor;

providing air circulating ports through the living area floor extending between the living area and the basement at preselected points adjacent said walls whereby convection currents are established between the living area and the basement so that during winter months air from the living area having a temperature below the ambient basement temperature will circulate to the basement to be warmed thereby establishing a base temperature within said structure equal to the ambient basement temperature, providing a hot water heating means within said structure for furnishing hot wash water; providing waste water collection means within said basement for collecting hot waste wash water; retaining said waste water in said basement until the temperature thereof is equal to the ambient temperature; and subsequently, disposing thereof automatically as hotter water comes in to take the place to the coldest water, and providing hot air grids above the waste water collection means, so as to allow the warmer air to ascend into living quarters; and with vertical panels to keep cold air entering the basement from chilling any warm air at the waste water collection means.

4,176,789
RAILROAD GRADE CROSSING PLATFORM AND AN END CAPPING DEVICE THEREFOR
Brett Rich, Malad City, Id., assignor to Industrial Sales & Marketing Corporation, Malad City, Id.
Filed Aug. 1, 1977, Ser. No. 820,728
Int. Cl.[2] E01B *21/00*
U.S. Cl. 238—8 3 Claims

1. An elongate device of right triangular formation in transverse cross-section for protectively capping an exposed end of a railroad grade crossing platform, said device comprising a substantially flat, inclined ramp member whose width extends longitudinally of the device and which has thickness beveled along its width to provide acute angled edges extending along said width at the ramp surface and flat surfaces extending backwardly therefrom as portions of the legs of the triangular formation; ramp-supporting members attached to and extending in mutually-spaced relationship from the underside of the ramp member intermediate its width and substantially normal to the ramp surface, said ramp-supporting members each, along with the ramp member, forming substantially a right triangle whose hypotenuse is on the ramp surface and whose legs are partially formed by the respective ramp-supporting members and partially by the ramp member; and means for securing said device to a railroad track tie at an end of the



grade crossing platform so that the ramp-supporting members engage the grade crossing platform and the upper surface of said tie, respectively, with the ramp surface being exposed as an inclined end for said grade crossing platform, the legs of the triangular formation being of unequal lengths corresponding, respectively, to mutually different standard rail heights, so that the device can be used with either of two rail heights corresponding to said lengths.

4,176,790
COMPOSITION FOR AND METHOD OF CAUSING RAINFALL
Manuel M. Osorio, 5 Oriente 401, Tecamachalco, Puebla, Mexico
Continuation-in-part of Ser. No. 882,875, Mar. 2, 1978, abandoned, which is a continuation of Ser. No. 727,123, Sep. 27, 1976, abandoned. This application Sep. 22, 1978, Ser. No. 944,799
Int. Cl.[2] A01G *15/00*
U.S. Cl. 239—2 R 18 Claims

1. The method of stimulating cloud formations to cause precipitation including introducing into a cloud formation a composition comprising a precipitation stimulating material suspended in a volatile liquid vehicle and finely dispersed therein, said precipitation stimulating material being substantially unsolubilized in the volatile liquid vehicle, said precipitation stimulating material being chilled by the evaporating liquid upon introduction into the cloud formation.

4,176,791
AUTOMATICALLY CONTROLLED IRRIGATION SYSTEM
Maurizio Cattaneo, and Renzo Masoero, both of Turin, Italy, assignors to Fiat Societa per Azioni, Turin, Italy
Filed Dec. 2, 1977, Ser. No. 856,950
Claims priority, application Italy, Dec. 30, 1976, 70139 A/76
Int. Cl.[2] B05B *15/00*
U.S. Cl. 239—76 8 Claims

4. An irrigation system for distributing an irrigation liquid from a source of supply therefor comprising:

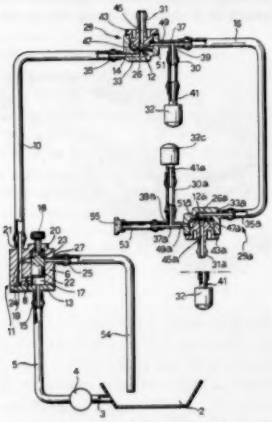
an elongated pipeline,

a plurality of liquid distributing nozzles spaced in series along the pipeline,

a plurality of liquid storage means communicating with the pipeline, each such storage means located adjacent and downstream from a corresponding nozzle,

a plurality of pressure responsive valve means in the pipeline, each of such valve means associated with a corresponding nozzle and adapted to open and close the discharge from the nozzle and flow through the pipeline,

each such valve means operable to open the pipeline to allow flow into the corresponding storage means and simultaneously close communication between the pipeline downstream of the nozzle and the nozzle outlet upon predetermined pressure in the pipeline upstream of the



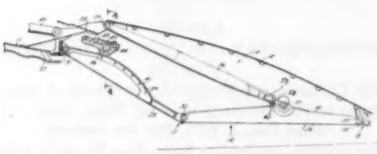
nozzle, and each such valve means operable to close the pipeline and open fluid communication between the nozzle and the downstream portion of the pipeline and storage means upon a lesser predetermined pressure in the pipeline upstream of the nozzle.

4,176,792

VARIABLE AREA EXHAUST NOZZLE

Arthur McCardle, Jr., Greenhills, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Jul. 11, 1977, Ser. No. 814,568
Int. Cl.[2] B64C *15/08*
U.S. Cl. 239—265.41 **14 Claims**



1. In a variable area nozzle of the type having a convergent flap pivotably connected to an exhaust duct and a divergent flap pivotably connected to the convergent flap, a linkage system comprising:

(a) a first link rigidly attached to the exhaust duct and extending outwardly thereof;

(b) a second link having one end pivotably attached to said first link and having its other end pivotably attached to the divergent flap; and

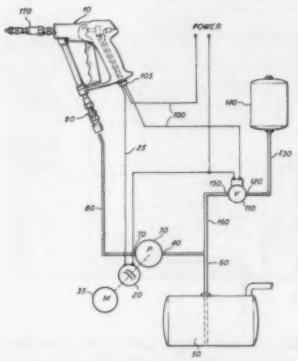
(c) means for rotating the convergent flap about its exhaust duct pivot so as to vary the nozzle area ratio in a predetermined manner.

4,176,793

ELECTRIC CLUTCH CONTROL

Elmer G. Heinrich, Siloam Springs, Ark., assignor to Citation Manufacturing Co., Inc., Siloam Springs, Ark.

Filed Mar. 3, 1978, Ser. No. 883,306
Int. Cl.[2] B05B *7/04*
U.S. Cl. 239—407 **2 Claims**



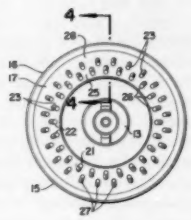
2. The improved cleaning system according to claim 1 wherein said improved spray gun has a compartment, isolated from the path within the gun through which the solvent passes, wherein said switches and said low power cable are located.

4,176,794

LIQUID PARTICLE DEFLECTOR STRUCTURE FOR DISCHARGE NOZZLES

George G. Allenbaugh, Jr., Wadsworth, Ohio, assignor to Premier Industrial Corporation, Cleveland, Ohio

Filed Oct. 27, 1977, Ser. No. 846,146
Int. Cl.[2] B05B *1/12*
U.S. Cl. 239—498 **5 Claims**

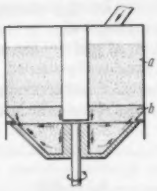


1. In a stream-forming pattern sleeve for a cylindrical liquid discharge nozzle, the combination of an angularly extending tooth-supporting surface provided on the end of said sleeve, a first row of upright circumferentially-spaced teeth projecting from said surface into the path of the discharge stream, a second row of upright circumferentially-spaced teeth projecting from said surface into the path of the discharge stream and radially outwardly of said first row, the teeth of said second row being of lesser width than the teeth of said first row, a stream-deflecting surface presented by each tooth, said stream-deflecting surface having forward portions thereof disposed to deflect said stream angularly toward adjacent teeth, whereby portions of said discharge stream are directed into intercepting relationship with each other to enhance liquid particle breakup of said stream.

4,176,795
METHOD OF DISINTEGRATING A MATERIAL

Alexandr V. Yagupov, Ordzhonikidze, U.S.S.R., assignor to Severo-Kavkazsky Gorno-Metallurgichesky Institut, U.S.S.R.

Filed Nov. 4, 1977, Ser. No. 848,723
Int. Cl.[2] B02C *23/18*
U.S. Cl. 241—21 6 Claims

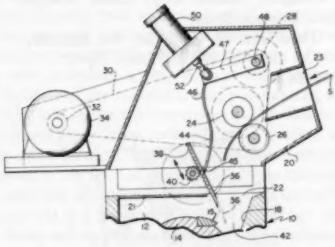


1. A method of disintegrating lumped materials into smaller particles comprising, continuously feeding into a vertical column a lumped, solid material which can be reduced by disintegration into solid smaller particles, directly rotating about the axis of said column of material a lowermost portion of said column of material having a configuration and with a velocity gradient increasing away from the axis and at a maximum rotational speed remote from said axis effective to develop an active horizontal, annular disintegration zone immediately above said lowermost portion of the vertical column of said material in which lumps of said material impact each other directly and the lumped solid material is disintegrated and simultaneously flowing disintegrated solid material from said lower portion outwardly and upwardly along the periphery of said column to continuously allow entry of lumped solid material into said disintegration zone, and disintegrated solid material into said lower portion, while simultaneously flowing the disintegrated solid material away from said column, all of said lumped solid material in said column being above the level of said disintegration zone and being held from rotation, and continuously maintaining a pressure head of said lumped solid material on said solid material in said zone by continuously replenishing said column above the level of said zone.

4,176,796
FEED DEVICE FOR SHEET GRANULATOR AND METHOD OF FEEDING SAME

William Barnes, South Attleboro; Roy W. Gerstenberg, Norfolk; Gomer E. Kropa, North Reading, all of Mass., and Roland A. LeJeune, Cumberland, R.I., assignors to Leesona Corporation, Warwick, R.I.

Filed Feb. 27, 1978, Ser. No. 882,210
Int. Cl.[2] B02C *18/22*
U.S. Cl. 241—30 12 Claims



1. In combination with a granulator for size reduction of material, a feeding device for feeding sheet material thereto, said granulator having walls defining a generally enclosed chamber including an upper wall, a rotor mounted for rotation about an axis within said chamber, cutting means affixed on said rotor, bed knife means mounted for projection into said chamber on the rotor downstroke side thereof for cooperative cutting relationship with said cutting means as said rotor is driven, a downstroke wall generally disposed in the chamber and in a quadrant thereof disposed above the horizontal axis of said rotor and on the downstroke side of the vertical axis thereof, said feeding device comprising a primary baffle disposed generally centrally above said rotor and having portions thereof proximate said downstroke wall, at least said portions disposed in said chamber quadrant and below said upper wall, means moving said baffle in said chamber towards and away from said downstroke wall thereof so as to define a variable dimension feed opening for said sheet material between opposed surfaces of said portion of said baffle and said downstroke wall, and means for feeding sheet material into said feed opening, said feeding means disposed in a position radially outwardly of those portions of said primary baffle and said downstroke wall forming said feed opening with respect to said rotor, said primary baffle further simultaneously respectively movable towards and away from said rotor so as to respectively increase and decrease the back pressure in said chamber and to deflect already granulated material from contacting said sheet.

4,176,797
FLUID MIXER AND COMMINUTER

Gibson D. Kemp, 3202 26th St., Lubbock, Tex. 79410

Filed Jun. 8, 1978, Ser. No. 913,573
Int. Cl.[2] B02C *7/02*
U.S. Cl. 241—30 11 Claims

1. The process of blending, mixing and comminuting fluid material using

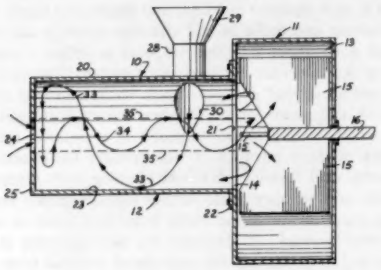
a. two discs each having an axis,
b. said discs being coaxial,
c. the periphery of said discs being closer together than the discs at their axis; comprising the method of:
d. forcing the fluid material between the discs near the axis, and
e. forcing the material between the peripheries of the discs, while
f. moving one disc relative to the other,
g. spinning one of the discs at high speed thereby
h. slinging fluid outward, the flow of fluid between the two discs
j. decreasing the pressure between the discs, thus
k. forcing the discs together.

4,176,798

METHOD AND APPARATUS FOR INDUCTION AND DISPERSION OF PARTICLES IN AN AIRSTREAM

John W. Talbott, and John M. Kirkwood, both of Moscow, Id., assignors to Washington State University Research Foundation, Inc., Pullman, Wash.

Filed Apr. 27, 1978, Ser. No. 900,433
Int. Cl.[2] B02C *19/06*
U.S. Cl. 241—39 **7 Claims**



1. An apparatus for induction and dispersion of particulate materials in an airstream, comprising:

a centrifugal blower having a central inlet and a tangential air discharge;

a horizontally oriented cylindrical tube having one end in open communication with the blower central inlet and having a choke orifice at an opposite end of smaller dimension than the opening of the tube to said central blower inlet;

upright particulate material infeed means in open tangential communication with the tube interior;

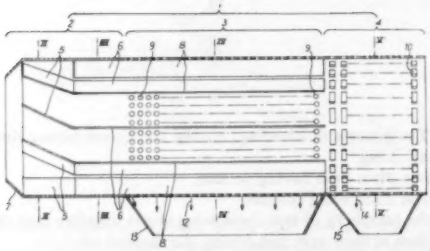
the combined cross-sectional area of said choke orifice and particulate material infeed means being less than the area across the blower inlet.

4,176,799

ROTARY SCREENS

Francois H. Clin; Jean-Noel Gony, both of Orleans, and Francois O. Proust, Olivet, all of France, assignors to Bureau de Recherches Geologiques et Minieres, Paris, France

Filed Dec. 29, 1977, Ser. No. 865,553
Claims priority, application France, Jan. 6, 1977, 77 00262
Int. Cl.[2] B02C *23/00*
U.S. Cl. 241—74 **7 Claims**



1. A rotary screen device for sorting by differential crushing and grading, particularly for sorting of mixed materials including mainly hollow glass and plastics materials, said screen comprising:

a central portion of said device, said central portion comprising a cylindrically-shaped sleeve of perforated metal sheeting and a plurality of parallel vanes disposed on the inner surface thereof in a direction parallel to the longitudinal axis of said sleeve;

an inlet end portion of said device, said inlet end portion comprising a cylindrically-shaped sleeve of unperforated metal sheeting connected to said sleeve of said central portion and a plurality of straight parallel vanes disposed on the inner surface thereof at an angle transverse to the longitudinal axis of said sleeve of said inlet end portion so as to assist the driving of products from said inlet end portion towards said central portion, each of said vanes of said inlet end portion being connected to one of said vanes of said central portion; and

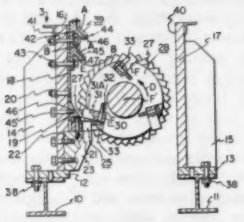
an outlet end portion of said device, said outlet end portion comprising a cylindrically-shaped sleeve of metal connected to said sleeve of said central portion having peripheral evacuation holes therein, said outlet end portion being free of vanes.

4,176,800

MATERIALS REDUCTION STRUCTURE

John C. Brewer, Salt Lake City, Utah, assignor to Garbalizer Corporation of America, Salt Lake City, Utah

Filed Jan. 11, 1978, Ser. No. 868,662
Int. Cl.[2] B02C *18/06*
U.S. Cl. 241—243 **6 Claims**



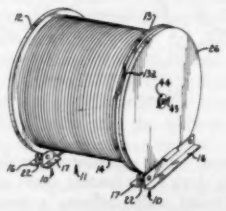
1. In materials' reduction machinery having an hopper, a stationary cutter bar proximate said hopper, and a horizontally journalled, revolvable rotor provided with cutting blades and disposed proximate said cutter bar: an improvement comprising a horizontal, materials' anti-revolvement member, secured to said hopper essentially above said cutter bar and having declining flange means provided with opposite declining parallel surfaces, and longitudinally, continuously, and uniformly spaced, for materials' passage, from said rotor and said blades for all orientations thereof, whereby to wedge and thereby tend to prevent rotation of materials in said hopper proximate said rotor and tending to pass between said member and said rotor such that said rotor is enabled to cut into said materials.

4,176,801

SUPPORT DEVICE FOR CABLE DRUMS

Homer C. Douglas, Kansas City, Kans., assignor to Cable Caddy, Inc., Lenexa, Kans.

Filed Dec. 16, 1977, Ser. No. 861,108
Int. Cl.[2] B65H *75/34, 75/40*
U.S. Cl. 242—54 R **4 Claims**



1. A device for rotatably supporting one end of a drum

having a substantially circular flange at each end thereof, said device comprising:

a pair of angle members each having a generally vertical plate portion and a generally flat, horizontal plate portion interconnected with said vertical plate portion, said angle members being interconnected with each other so that the vertical plate portions of said angle members are spaced apart from one another to present a space therebetween large enough to receive said flange and so that the horizontal plate portions of said angle members cooperate to provide a base for supporting said angle members on a surface;

a pair of rollers mounted for rotation in the space between said vertical plate portions and spaced apart from one another to receive the flange thereon, whereby the flange may be rotated about its axis on said rollers; and

means presenting an opening through one of said vertical plate portions at a location to accommodate cable wound on the drum in proximity to the edge of the flange.

4,176,802

APPARATUS FOR LAYING BALLS OF STRANDED MATERIAL INTO CUPS OF A CONVEYOR

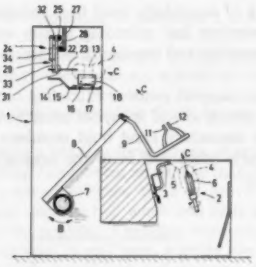
Florian Lucke, Mengen, Fed. Rep. of Germany, assignor to Lucke Apparatebau GmbH, Mengen, Fed. Rep. of Germany

Filed Apr. 28, 1978, Ser. No. 900,917

Claims priority, application Fed. Rep. of Germany, May 28, 1977, 2724424

Int. Cl.² B65H *54/66, 67/00*

U.S. Cl. 242—2 **5 Claims**



1. In a winding machine for winding walls of stranded material having a conveyor including cups in which wound balls are laid for conveying from the machine, a winding station on one side of the conveyor having a winding flyer and a mandrel for winding a ball of stranded material, an improved apparatus for laying balls of stranded material in cups of the conveyor, comprising a pivotable arm pivotally mounted at its one end and carrying at its free end engagement means located at said one side of the conveyor for engaging on said mandrel a ball having opposite polar ends to bring the ball into position above a cup of the conveyor with the polar ends aligned transversely of the conveyor, an operating linkage mounted adjacent to the conveyor and including a pair of take-off members having points at the ends of the members, said points being located on the other side and above the conveyor, said points being movable toward and away from each other and located relative to said engagement means when the engagement means support the ball above a cup so that the points can be moved to penetrate into said ball adjacent to one polar end thereof and provide between them a horizontal axis on the other side of said conveyor from said engagement means for subsequent pivotal movement of the other polar end of the ball, said points constituting the sole engagement means of the take-off members for engaging the ball, and means for operating the linkage whereby the points on the take-off members are pressed into a ball that has been carried by the pivotable arm to a position above a cup of the conveyor, so that when the ball is released by said engagement means of the pivot arm said other polar end pivots downwardly into the cup about the horizontal axis provided by said points.

4,176,803

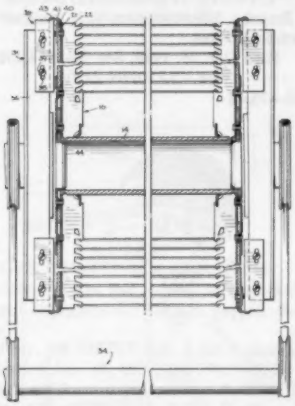
MACHINE FOR WINDING PILE FABRIC ON A REEL

Theodore P. Kessler, Rancocas, N.J., assignor to Timron, Inc., Moorestown, N.J.

Filed Dec. 15, 1977, Ser. No. 860,963

Int. Cl.² B65H *17/02, 75/02;* B65D *85/671*

U.S. Cl. 242—67.1 R **8 Claims**



7. A machine for winding pile fabric on a reel having a pair of end frames, each said end frame including an endboard of polygonal shape and a plurality of radially disposed hook strips secured to said endboard, said machine comprising

a pair of rotatable holding frames, each said holding frame having a plurality of holding means, each holding means securing an outer end of each hook strip of a reel disposed between said holding frames to each respective holding frame.

4,176,804

REEL FOR TAPE

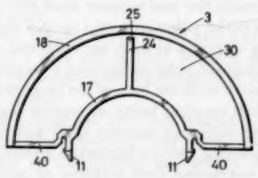
Tsuneo Nemoto, Sendai, and Kiichiro Toyoshima, Izumi, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed May 15, 1978, Ser. No. 905,893

Claims priority, application Japan, May 20, 1977, 52-65674[U]

Int. Cl.² B65H *75/22*

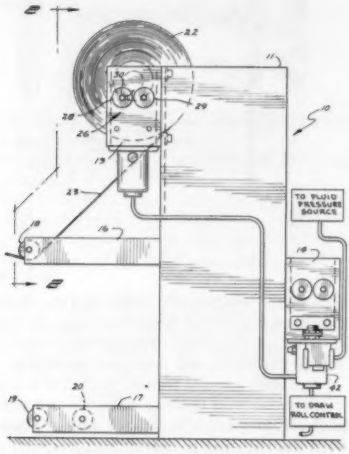
U.S. Cl. 242—68.5 **9 Claims**



1. A reel for tape comprising first and second segmental reel hubs which are demountable from each other; at least said first segmental reel hub including segmental inner and outer members, connecting members connecting together said segmental inner and outer members at their ends, considered in the circular direction, so that a sectorial space is defined between said segmental inner and outer members, and at least one rib joined to, and extending from one of said segmental inner and outer

members substantially across said sectorial space to adjacent the other of said inner and outer members with a clearance being defined between said other member and an adjacent edge of said rib.

4,176,805
UNWIND STAND-ROLL BRAKE
Martin A. Jackson, Saunderstown, R.I., assignor to Sheldahl, Inc., Northfield, Minn.
Filed Oct. 25, 1978, Ser. No. 954,430
Int. Cl.[2] B65H *23/06*
U.S. Cl. 242—75.46 **6 Claims**



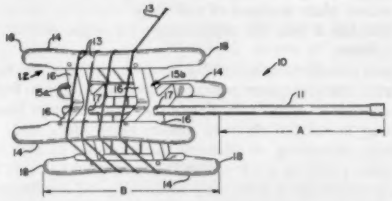
1. Braking system for applying a controllable braking torque to the support shaft of a film supply roll arranged to provide a supply of flexible film to an intermittently operated film draw system, said braking system comprising:

(a) frame means, a support shaft for supporting a film supply roll therearound, bearing means journably supporting said support shaft for free axial rotation within said frame means and including at least two pairs of support rollers with one pair being mounted at each end of said support shaft and arranged in axially spaced apart parallel relationship with said support rollers being journaled for rotation within said frame means and providing a free rotational support cradle for said support shaft therebetween;

(b) a pair of brake yokes mounted on said frame means with one being disposed at each opposed end of said support shaft, each brake yoke comprising a generally "U" shaped shaft receiver with the base of the inner peripheral surface of said shaft receiver being an arcuate segment generally concentric with said support shaft and having an outer shaft contacting surface formed as a friction pad for frictionally restraining free rotation of said support shaft when in contact therewith; and

(c) means for reciprocatorily raising and lowering said brake yokes for bringing said shaft contacting surface into and out of contact with said support shaft to provide lifting support of said support shaft and frictional engagement and braking between said friction pad and the periphery of said support shaft when said brake yokes are raised and to permit free rotation of said support shaft upon said support rollers when said brake yokes are lowered.

4,176,806
REEL ASSEMBLY FOR CONTROLLING CORD WINDING IN KITE FLYING
Nathan J. Kwon, 1625 Greenleaf Ave., Des Plaines, Ill. 60018
Continuation-in-part of Ser. No. 806,922, Jun. 15, 1977, abandoned. This application Jun. 19, 1978, Ser. No. 916,478
Int. Cl.[2] B65H *75/48*
U.S. Cl. 242—96 **10 Claims**



1. A reel assembly for controlling line cord winding in kite flying comprising:

an elongated main hand hold member adapted for controlling the winding of the reel assembly;

an axle member affixed to and coaxially extending from the main hand hold member;

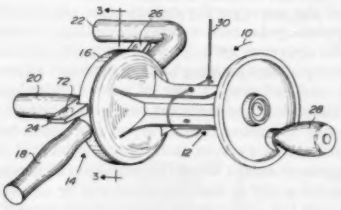
a spool member having a central axis and adapted for receiving, storing, and releasing the cord, the spool member rotatably mounted on the axle member;

a clutch mechanism for releasably fixing the spool member to the main hand hold member;

a plurality of secondary hand hold members affixed to the spool member and extending axially with respect to the spool member and capable of releasably storing the cord; and

at least one support member extending radially with respect to the central axis of the spool member for fixably mounting the secondary hand hold members spaced remotely from each other and from the central axis of the spool member.

4,176,807
KITE-FLYING CONTROL REEL
Nathan J. Kwon, 1625 Greenleaf Ave., Des Plaines, Ill. 60018
Filed Aug. 24, 1978, Ser. No. 936,327
Int. Cl.[2] B65H *75/40*
U.S. Cl. 242—96 **19 Claims**



1. A kite-flying control reel comprising:

a first elongated handle;

an axle affixed at a right angle to the first elongated handle;

a second handle affixed to the first elongated handle at a right angle thereto and extending parallel to and away from the axle; and

a spool rotatably mounted on the axle.

4,176,808

PASSENGER RESTRAINING SEAT BELT RETRACTOR

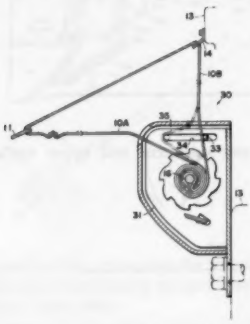
Shiro Sasaki; Jun Yasumatsu, both of Toyota, and Mitsuo Inukai, Nagoya, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha and Kabushiki-Kaisha Tokai-Rika-Denki-Seisakusho, both of Aichi, Japan

Filed Jul. 25, 1977, Ser. No. 818,302

Claims priority, application Japan, Aug. 6, 1976, 51-105010

Int. Cl.[2] A62B *35/00;* B65H *75/48*

U.S. Cl. 242—107.1 **4 Claims**



1. A seat belt retractor for retracting two seat belts therein comprising:

a base;

two seat belts for restraining a passenger's shoulder and waist positions;

a retractor shaft rotatably supported by said base thereon, and wherein said two seat belts are wound up one over the other;

a means for applying a retracting force to said retractor shaft; and

a means for applying a bending force to one of said two seat belts, said bending force being smaller in magnitude than said retracting force whereby slack is prevented from occurring at said one seat belt when said belts are wound out, said means for applying a bending force comprising a pair of opposing slots in said base, a guide pin extending through and slidable in said slots and engaging with one of said belts and a spring means provided between said guide pin and said base.

4,176,809

ACCELERATION-SENSITIVE DEVICE

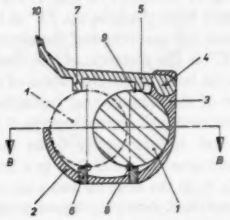
Rudy Thomas, Concord, Tenn., and Fred F. Neumann, Rochester, Mich., assignors to N.V. Klippan S.A., Haasrode, Belgium

Filed Jun. 15, 1978, Ser. No. 915,695

Claims priority, application Fed. Rep. of Germany, Jul. 9, 1977, 2731072

Int. Cl.[2] A62B *35/02;* B65H *75/48*

U.S. Cl. 242—107.4 A **7 Claims**



1. In an acceleration-sensitive device comprising a rollable, freely movable inertia member supported in a depression provided in a support member, and an actuator means disposed above said inertia member and engageable with a locking means provided in said device, said actuator means being provided with a depression facing said inertia member, the improvement comprising said depression (6) on said support member (2) and said depression (7) on said actuator means (2) being in the form of a ring facing towards said inertia member (1), said inertia member having an approximately spherical shape, each of said rings having inner and outer circumferential edges, said inertia member being normally in contact with said inner edges, and said support member (2) extending laterally outside its ring (6) in an upwards direction so as to at least partially surround said inertia member (1).

4,176,810

LOCK SENSITIVITY ADJUSTOR

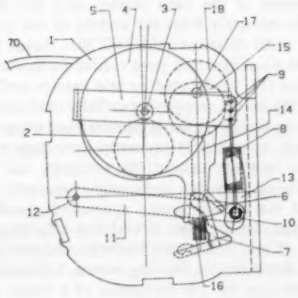
Jacques A. Bertrand, Paris, and Robert A. Marechal, Bezons, both of France, assignors to Klippan France, S.A., Paris, France

Continuation of Ser. No. 673,331, Apr. 5, 1976, abandoned. This application Jun. 19, 1978, Ser. No. 916,663

Claims priority, application France, Apr. 7, 1975, 75 10783

Int. Cl.[2] A62B *35/02;* B65H *75/48*

U.S. Cl. 242—107.4 B **5 Claims**



1. In a belt retractor, said retractor including a belt receiving spool rotatably mounted on a frame, comprising:

means for sensing acceleration of said spool in a belt protracting direction;

a mobile support means connected to said frame and movable between a first and second position responsive to sensing of a predetermined acceleration of said spool by said sensing means;

blocking means connected with said mobile support means and actuated by movement of said mobile support means from the first to the second position to block further protractive movement of said spool;

spring means connected to said mobile support means for biasing said mobile support means to said first position;

means for varying the force of the spring on the mobile support means whereby the sensitivity of the blocking means to acceleration of the spool can be varied;

means for actuating said spring force varying means from a weak sensitivity position when the belt is being initially withdrawn to a high sensitivity position when the belt is protracted to a position of use.

4,176,811

CONICAL YARN CARRIER

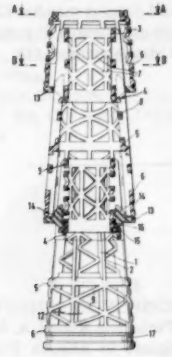
Josef Becker; Hubert Becker, and Matthias Becker, all of Niederforstbacher Strasse 80-84, 5100 Aachen-Brand, Fed. Rep. of Germany

Filed Jun. 29, 1978, Ser. No. 920,545

Claims priority, application Fed. Rep. of Germany, Jul. 8, 1977, 2730875

Int. Cl.[2] B65H *75/10, 75/20*

U.S. Cl. 242—118.1 **5 Claims**



1. A conical yarn thread carrier having a longitudinal axis and comprising carrier surface means (2) defined by a frustum jacket surface having a large diameter end and a small diameter end, radially extending openings (10) between said carrier surface means (2), slot means (11) uniformly distributed about the circumference of the yarn carrier, said slot means (11) extending approximately from the middle of the yarn carrier axially to its small diameter end, said slot means forming a portion of said openings, said yarn carrier further comprising stop ring means (13, 14) located on said carrier surface means (2), said stop ring means comprising radially outwardly extending means for receiving the large diameter end of another yarn carrier thereon, and radially inwardly extending projections (14) guided in said slot means (11), whereby said stop ring means is axially displaceable along said yarn carrier over the length of said slot means, means operatively positioned for limiting the axial displacement of said stop ring means (13, 14) to the length of said slot means between said small diameter end and said displacement limiting means, and means at said larger diameter end for the formation of a freely accessible thread reserve.

4,176,812

MIDCABIN DOOR FOR BLENDED WING AIRCRAFT

Irwin G. Baker, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Oct. 31, 1977, Ser. No. 847,100

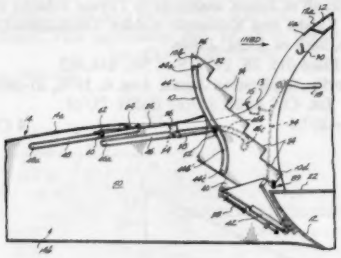
Int. Cl.[2] B64C *1/14*

U.S. Cl. 244—129.5 **21 Claims**

1. In an aircraft of blended wing design having a fuselage and a wing, said wing having an upper surface, that blends smoothly into the fuselage to form a blend region between said wing and said fuselage, said aircraft having a door opening in said fuselage, at least a portion of said opening extending into said upper surface of said wing, a door assembly comprising:

a door having an upper portion and a lower portion and having an exterior panel conforming to the shape of the fuselage and the blend region when the door is in a closed position; and

first means for mounting said door for swinging movement between said closed position wherein said upper portion of the door is adjacent an upper portion of the door opening and said lower portion of said door is adjacent a lower portion of said door opening and an open position wherein said upper portion of said door is located outwardly from



said fuselage and subjacent said upper surface of said wing.

4,176,813

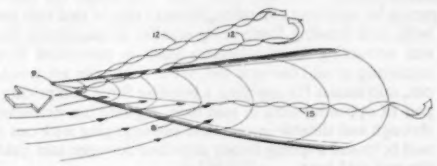
SHARK NOSE FOR AIRCRAFT

Jack W. Headley, Rancho Palos Verdes; Andrew M. Skow, Hermosa Beach, and Andrew Titiriga, Jr., Torrance, all of Calif., assignors to Northrop Corporation, Los Angeles, Calif.

Continuation-in-part of Ser. No. 839,583, Oct. 5, 1977, abandoned. This application Dec. 7, 1978, Ser. No. 967,162

Int. Cl.[2] B64C *1/00, 21/10*

U.S. Cl. 244—130 **5 Claims**

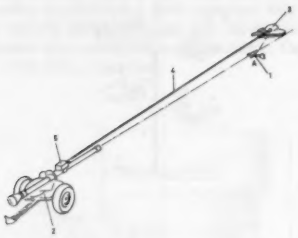


1. A nose and forebody for an aircraft fuselage characterized by a nose tip having a slight radius in planform and flattened profile in elevation, said nose tip tapering broadly rearwardly with relatively sharp lateral edges on each side thereof, said nose tapering more acutely as said nose blends into said forebody, the cross-sectional shape of said forebody rearwardly of said nose tip and said lateral edges gradually thickening in elevation from a relatively narrow elliptical shape to a relatively broad elliptical shape, the dimensions of said nose and forebody varying as functions X/R_B, Y/R_B and Z/R_B where "X" is the distance from the nose tip, "Y" is the distance of the fuselage skin from the centerline of the aircraft fuselage taken transversely, "Z" is the distance of the fuselage taken vertically and R_B is the body planform radius of the fuselage taken at the midpoint of the longitudinal centerline thereof, X/R_B varying between zero and approximately 0.35, Y/R_B varying between zero and approximately 0.284 and Z/R_B varying between zero and approximately 0.09 in a first region between a first station X_0 Y_0 at the nose tip and a second predetermined station X_1 Y_1 and X/R_B varying between approximately 0.35 and 2.0, Y/R_B varying between approximately 0.284 and 0.489 and Z/R_B varying between approximately 0.09 and 0.261 in a second region between the second station X_1 Y_1 and a third station X_2 Y_2.

4,176,814
TERMINALLY CORRECTED PROJECTILE

Kjell A. Albrektsson; Bertil T. Eriksson; Sven W. Eriksson; Hans A. E. Franzén, and Rolf H. Sandlin, all of Karlskoga, Sweden, assignors to AB Bofors, Bofors, Sweden

Filed Mar. 11, 1977, Ser. No. 776,683
Claims priority, application Sweden, Apr. 2, 1976, 7603926
Int. Cl.[2] F42B *15/10, 13/30, 15/02*
U.S. Cl. 244—3.15 11 Claims



1. An apparatus for correcting the terminal portion of the ballistic trajectory of a rotating projectile to direct the projectile to a target, comprising:

targeting means for directing a beam of coherent light at said target;

at least one target detector means disposed for rotation with said rotating projectile and facing obliquely forward in the direction of travel of said projectile to scan in a spiral pattern the area adjacent the projected point of impact of the projectile, said at least one target detector having means for generating a particular ignition signal when the coherent light reflected from said target is detected;

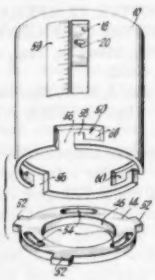
motor means for generating a thrust pulse in response to an ignition signal;

at least one nozzle means connected to said motor means and having plug means responsive to said particular ignition signal to pass said thrust pulse, said at least one nozzle means directing the passed thrust pulse in a direction to correct the trajectory of said projectile.

4,176,815
VARIABLE SPRING HANGER ASSEMBLY

Thomas Davidson, Centerport, N.Y., and Charles Cunneen, Morganville, N.J., assignors to F & S Manufacturing Corporation, Brooklyn, N.Y.

Filed Sep. 8, 1977, Ser. No. 831,587
Int. Cl.[2] F16L *3/00*
U.S. Cl. 248—589 4 Claims



1. A variable spring hanger assembly for supporting a pipe, comprising:

a hollow housing having a lower end portion, said housing having at least two bayonet slot openings defined in said lower end portion,

an upper piston plate slidably mounted within the upper portion of the housing for vertical movement therein,

a lower plate, said plate having at least two fragmented annular openings defined therein spaced from the outer circumference of said plate,

spring means interposed between said upper and lower plates for urging said upper piston plate upwardly away from said lower plate,

and means mounting said lower plate immovably within the lower end of said housing,

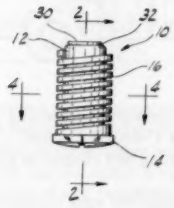
said mounting means comprising at least two fingers extending outwardly from said lower plate, and engaging said bayonet slot openings defined in the lower end portion of said housing, the length of said annular openings being approximately equal to the horizontal length of said bayonet slots and in alignment with the major circumferential diameter of said spring means.

3. In the method of assembling a variable hanger assembly in which a spring is inserted against an upper piston plate secured to a housing, and a lower plate is secured against a spring, the improvement comprising providing at least two fingers on the lower plate and providing two complimentary bayonet slots having defined therein an open slot and a blind slot, in the lower end of the housing, further providing fragmented annular openings spaced inwardly from the circumference of the lower plate and in substantial alignment with the spring, introducing means through said openings, to force the spring inwardly within the housing, and sufficiently so that when the plate is completely within the open slot, the spring still does not abut the plate, rotating the plate so that the fingers move from the open slot to the blind slot of the bayonet slots, removing the force means so that the spring moves into contact with the lower plate, said plate fingers engaging said blind slot.

4,176,816
PROCESS FOR IMPROVING IMPACT RESISTANCE OF RIGID NYLON ARTICLES AND THE ARTICLES PRODUCED THEREFROM

Gregory O. Corkery, Valley Park, Mo., assignor to Arundale, Inc., St. Louis, Mo.

Filed Sep. 14, 1977, Ser. No. 833,168
Int. Cl.[2] F16M *11/20*; B29C *25/00*
U.S. Cl. 248—188.9 8 Claims



5. An article of manufacture comprising:

a member formed of molded, rigid nylon adapted to provide impact resistance;

said member defining a chamber therewithin;

water in said chamber and in intimate contact with said rigid nylon;

said water being in said chamber in sufficient quantity so that said water may be absorbed by said nylon over a long period of time; and

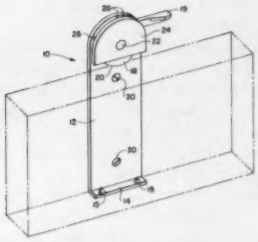
sealing means associated with said member for sealing said water within said chamber.

4,176,817

RELEASABLE HOLDER FOR BOXES

Willard H. Jones, 526 Pratt St., Longmont, Colo. 80501

Filed Sep. 27, 1978, Ser. No. 947,239
Int. Cl.[2] F16M *13/00*
U.S. Cl. 248—313 9 Claims



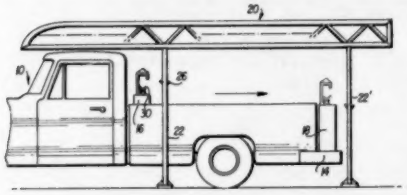
1. A holder for boxes comprising:
a base member having a planar surface defined thereon;
fixed engaging means carried on the planar surface of the base member and adapted to securely engage a surface disposed substantially normal to the planar surface at a position adjacent to the planar surface;
an eccentric member mounted adjacent the planar surface and spaced from the fixed engaging means, the eccentric member being rotatably carried on an axis perpendicular to the planar surface; and
locating means to releasably secure the eccentric member at one of a plurality of predetermined rotational positions.

4,176,818

LOAD-LIFTING AND CENTERING DEVICE

Edwin H. Roxby, 11428 Connecticut Ave., Kensington, Md. 20795

Filed Mar. 10, 1978, Ser. No. 885,414
Int. Cl.[2] B60P *1/64*
U.S. Cl. 248—354 H 10 Claims



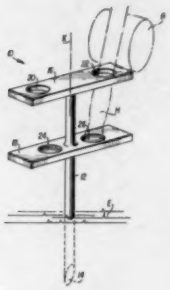
1. A supporting apparatus comprising
at least one open V-shaped channel;
means for supporting said channel in a substantially horizontal mode;
an aperture through the apex of said channel between the terminal ends thereof;
a frustum open at both ends with its larger end mounted adjacent said open V-shaped channel substantially above said aperture;
a centering pin of a dimension such that it will pass through said aperture and the smaller end of said frustum;
a V-shaped beam mounted to one end of said centering pin having a configuration to substantially mate with said V-shaped channel; and
means for supporting and moving said V-shaped beam and said pin into mating position with said channel and said aperture respectively.

4,176,819

PORTABLE FISHING ROD HOLDER

Joe A. Lowe, 2437 Cherokee La., Winston-Salem, N.C. 27103

Filed Dec. 16, 1977, Ser. No. 861,346
Int. Cl.[2] A01K *97/10*
U.S. Cl. 248—513 7 Claims



1. A fishing rod device adapted to support a pair of fishing rods in a manner such that the fishing rods are inclined relative to one another comprising an elongate shaft having a longitudinal axis and a pointed free end which is adapted to penetrate the earth, an upper and a lower plate rigidly affixed to said shaft in axially spaced relation to each other along a portion of said shaft opposite said free end, said upper plate having at least two through bores substantially symmetrically arranged to each side of the axis of said shaft, said through bores being spaced apart a given distance, said lower plate having at least two blind bores opening toward said upper plate and substantially symmetrically arranged to each side of the axis of said shaft, said blind bores being spaced apart a distance less than said given distance whereby said pair of fishing rods are inclined outwardly relative to the axis of said shaft and are maintained spaced apart from each other and from said shaft;
an intermediate plate affixed to said shaft between said upper and lower plates, said intermediate plate having at least two through bores substantially symmetrically arranged to each side of the axis of said shaft, the through bores of said intermediate plate being spaced apart a distance less than said given distance and greater than the distance between said blind bores; and
said lower and intermediate plates each having a central bore through which said shaft extends and said upper plate having a central blind bore in which an end of said shaft is secured.

4,176,820

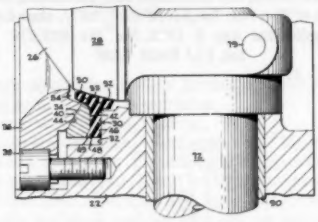
PRESSURE-SENSITIVE TEMPERATURE-RESPONSIVE ROTARY VALVE FOR CRYOGENIC TEMPERATURES

William W. Broadway, Houston, Tex., assignor to FMC Corporation, San Jose, Calif.

Filed Jul. 5, 1977, Ser. No. 812,951
Int. Cl.[2] F16K *1/22*
U.S. Cl. 251—317 10 Claims

1. A pressure-sensitive temperature-responsive rotary valve having a generally annular valve body defining a fluid flow passage, a fluid flow control element rotatably supported in the flow passage for controlling the flow of fluids through the valve, an annular yieldable, pressure-responsive valve seat positioned in the flow passage for cooperation with the flow control element to establish a fluid flow barrier through said passage, a temperature-responsive valve seat energizer ring positioned in the flow passage for imposing a force on the valve seat to cause the seat to establish a fluid-tight seal with the flow control element and the valve body, said energizer ring having an annular frusto-conical surface, and means for retaining the energizer ring in position against the valve seat,

said retaining means having a frusto-conical surface complementary to and in contact with the energizer ring frusto-conical surface and wherein the coefficient of contraction of said energizer ring is greater than the coefficient of contraction of said retainer means and said valve body whereby when the valve is subjected to a reduction in temperature the energizer ring contracts more than the valve body and the retainer means, the contraction of said energizer ring causes a radial inward movement of said energizer ring forcing said frusto-conical surface of said energizer ring against the frusto-conical surface of said retainer means, moving said energizer ring against said valve seat to cause said energizer ring to exert a sealing force radially and axially on said valve seat when the valve is subjected to a reduction in temperature, the improvement in the valve seat comprising:



a leg portion extending generally outward from the flow passage, at least one outer pressure-responsive sealing lip extending in a generally axial direction from the leg portion along the surface of the flow control element when said element is in closed position, and a central sealing lip extending in a generally radial direction from the leg portion toward the flow control element, said outer sealing lip being longer than said central sealing lip causing said outer sealing lip to contact said closed flow control element and causing said central sealing lip to be positioned adjacent to but spaced from said closed flow control element at ambient temperatures, contraction of said energizer ring at lower temperatures forcing said central sealing lip against said closed flow control element to provide an additional flow barrier when the valve is subjected to a reduction in temperature.

4,176,821

PILOT-OPERATED VALVE ASSEMBLY

Reiner Strangfeld, Minden -Leteln, Fed. Rep. of Germany, assignor to Georg Rost & Sohne, Porta Westfalica, Fed. Rep. of Germany

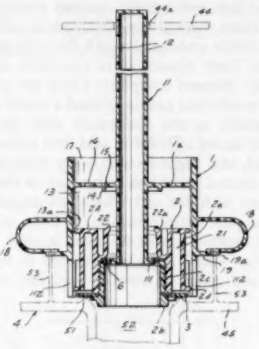
Continuation of Ser. No. 774,428, Mar. 4, 1977, abandoned. This application Oct. 12, 1978, Ser. No. 950,691

Claims priority, application Fed. Rep. of Germany, Mar. 5, 1976, 2609138

Int. Cl.[2] F16K *31/12;* **E03D** *1/35;* **F16K** *51/00*

U.S. Cl. 251—38 **19 Claims**

1. A valve assembly for evacuation of liquids from low pressure vessels of the type including a bottom wall having an outlet opening and a seat surrounding said opening, comprising a main valve including said seat and a buoyant valve element movable up and down between open and closed positions in which a portion of said element is respectively remote from and sealingly engages said seat, said element having an upper surface; a housing defining with said element a liquid-receiving chamber above said upper surface so that the static pressure of the column and having inlet means to allow the flow of liquid into said chamber in said chamber urges said element to said closed position, the buoyancy of said element being such that said element moves and floats from said closed position, in the absence of application of liquid pressure in a direction to lift said element off said seat, when the height of said liquid column is reduced below a predetermined value; and a pilot valve means actuatable to allow the liquid to flow from said chamber into said outlet opening in said closed position of said element and to thus reduce the height of said liquid column below said



predetermined value in response to the actuation of said pilot valve means.

4,176,822

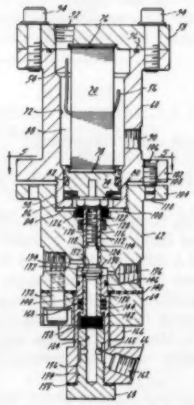
FUEL INJECTION SYSTEM AND CONTROL VALVE FOR MULTI-CYLINDER ENGINES

Alexander Chadwick, South Lyon, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Oct. 31, 1977, Ser. No. 846,757

Int. Cl.[2] F16K *11/02, 31/04*

U.S. Cl. 251—129 **6 Claims**



1. A fuel injector control valve comprising:

a valve body having first and second elements, an inlet to the valve body, an outlet from the valve body, a fluid passage connecting the inlet and the outlet, a valve element movably mounted on one of said two body elements for controlling flow through the fluid passage, electro-expensive actuating means on the other body element for actuating said valve element, a seat in said one body element, means biasing said valve element to seat on said seat, and means providing for selectively positioning and locking the two valve body elements with respect to each other so that essentially the full expansion of said electro-expansive actuating means is used to move said valve element away from said seat;

wherein said means providing for selectively positioning and locking the two valve body elements with respect to each other comprises means providing for rotation of the two

valve body elements relative to each other to perform the selective positioning and means for locking the two body elements at discrete increments of relative rotation; and

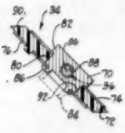
wherein said first valve body element comprises a series of locating holes which are disposed at uniform intervals around a circle concentric with the axis about which the two valve body elements are rotatable and said second valve body element comprises a first set of locating holes disposed at selected points around a circle which is of the same diameter as and concentric with the circle around which said series of holes in said first valve body element is disposed, said second valve body element further comprising a second set of holes disposed on the same circle as the first set of holes and which are angularly related in selected angular relationship to the holes of said first set of holes and locking means disposed in each of said second set of holes which may be actuated to engage selected holes of said series of holes in said first valve body element.

4,176,823

BUTTERFLY VALVE

Themistocles H. Gliatas, Worthington, Ohio, assignor to Ranco Incorporated, Columbus, Ohio

Filed Oct. 7, 1977, Ser. No. 840,163
Int. Cl.[2] F16K 1/226
U.S. Cl. 251—306 **2 Claims**



1. A flow control valve comprising:

(a) a tubular valve body defining a fluid passage;

(b) a butterfly valving member disposed in said passage comprising;

(i) a hub defining an end flange, a barrel portion projecting from said end flange having a transverse opening therethrough, and a skirt-like portion at the end of said barrel portion remote from said end flange;

(ii) a flexible resilient disc-like valving element having an outer peripheral face engageable with the surrounding valve body to block said passage and an inner peripheral face engageable with and extending about said barrel portion; and

(iii) first and second support plates for stiffening and supporting said valving element, said first plate disposed about said barrel portion between one major surface of said valving element and said end flange and said second plate disposed about said skirt-like portion and extending along the opposite major surface of said valving element and said remote end of said barrel portion, said valving element outer peripheral face disposed outwardly of the outer peripheries of said first and second plates;

(iv) said skirt-like portion yieldably deformed to clamp said second support plate against said remote end and into engagement with said valving element, said second plate compressing said valving element against said first plate and into engagement with said barrel; and,

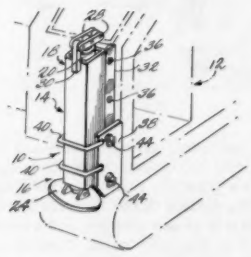
(c) a shaft for actuating said valving member extending transversely through said valve body and supported by said valve body on opposite sides of said valving member, said shaft extending through said opening in said barrel and defining circumferentially spaced spline-like teeth extending into the opening wall with material of said hub being yielded and displaced by said teeth and disposed circumferentially between adjacent teeth to lock said barrel and shaft against relative rotation.

4,176,824

LIFTING APPARATUS

Francis E. Linton, 207 Oak La. S.W., Glen Burnie, Md. 21061, and Richard Lewis, 630 Markham Rd., Baltimore, Md. 21229

Continuation of Ser. No. 766,513, Feb. 7, 1977, abandoned. This application Apr. 5, 1978, Ser. No. 893,274
Int. Cl.[2] B60S 9/08
U.S. Cl. 254—86 R **5 Claims**



1. Apparatus for lifting an object relative to a surface comprising,

(a) an extendable device having an elongated body terminating at a first end fitted with means for engaging the surface and terminating at a second end,

(b) mounting means attached to the second end and offset from the body of the extendable device for adjustably mounting the second end of the extendable device on the object, and having an apertured support portion,

(c) a fixture on the object for slidably receiving the mounting means therein, including two spaced apart structural members receiving said apertured portion therebetween,

(d) at least two apertures through the mounting means apertured portion in a direction at right angles to the lengthwise dimension of the elongated body of the extendable device and in a direction not intersecting the position of the extendable device,

(e) at least two apertures through each spaced apart structural member of the fixture in a direction to align with the apertures through the mounting means apertured portion,

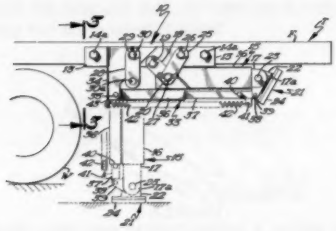
(f) a pair of readily removable pins each passed through an aperture in each of the fixture structural members and an aligned aperture of the mounting means apertured portion, and

(g) one or both of (i) each of the fixture structural members and (ii) said mounting means apertured portion, having a plurality of apertures therethrough to permit adjustable mounting of the mounting means in the fixture by use of said pins through aligned apertures of the fixture and mounting means so that the extendable device may be mounted in the fixture at various positions for accommodating various distances between the object and the surface, whereby an extendable device may be employed which is extendable for a distance less than would be required if the mounting means were permanently fixed to the object.

4,176,825
JACK DEVICE FOR TRAILERS

Donald D. Schwebke, Box 302, Hampton, Iowa 50441

Filed Feb. 1, 1978, Ser. No. 874,147
Int. Cl.[2] B66F 7/22
U.S. Cl. 254—94 11 Claims



1. A jack device for trailers having a frame and having ground engaging wheels, comprising:

a bracket attached to the trailer,

an elongate leg structure including an upper leg member and a lower leg member projecting telescopically into said upper leg member, said lower leg member being extensible and retractable relative to said upper leg member, means pivotally mounting said leg structure on said bracket for swinging movement relative thereto between lowered load supporting position and a raised transport position, said leg structure when in the transport position being supported on the frame above the surface of the ground, and when in the lowered load supporting position being disposed in substantially vertical ground engaging relation and supporting the trailer whereby the adjacent trailer wheel is elevated above the surface of the ground,

an elongate motion-transmitting link member having one end thereof connected to said bracket having the other end thereof connect to said lower leg member, said motion-transmitting link member including an upper link and a lower link and being extensible and retractable relative thereto,

said motion-transmitting link member causing said lower member to be extended when said leg structure is shifted from the transport position to the lowered load supporting position, means operatively connected with said leg structure yieldably resisting movement thereof to the transport position,

and a foot member having a flat lower surface and being pivotally mounted on the lower end of said leg structure for pivotal movement relative thereto whereby said foot member will be maintained in planar contact with the ground surface when the foot member engages the ground surface.

4,176,826
SAFETY CATCH APPARATUS FOR A SUSPENSION SYSTEM

David A. Gray, Waukesha, and Marvin L. Sivertsen, Milwaukee, both of Wis., assignors to General Electric Company, Milwaukee, Wis.

Filed Jul. 3, 1978, Ser. No. 921,197
Int. Cl.[2] B66D 1/48
U.S. Cl. 254—175 9 Claims

1. A safety catch apparatus for retaining a suspended member in the event that the suspension system fails, comprising:

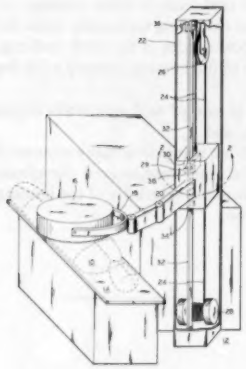
a. a generally vertically supported stationary bar;

b. said suspended member having an aperture adapted to receive said stationary bar;

c. said suspended member further including an inner chamber having an upper and a lower surface communicating with said aperture;

d. a catch block sized to fit within said chamber and including a vertical slot adapted for slideable engagement with said stationary bar, said suspended member with said catch block thus being constrained to jointly move along said stationary bar;

e. said vertical slot having at least one open recess in the sides thereof, each said recess having a base and an inner wall angulated toward said slot;



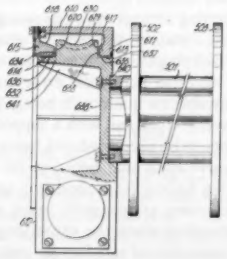
f. a roller which freely rests in the base of each said recess, each said roller and said base being sized so that the roller is adjacent to, and spaced from, said stationary bar;

g. means for generating relative motion between each said roller and said catch block in the event of a suspension failure whereby each said roller becomes wedged between said inner wall and said stationary bar such that said stationary bar supports said suspended member.

4,176,827
WINCH DRUM MOUNTED DIRECTLY ON A WORM GEAR DRIVE UNIT

Clay H. Anderson, and Gerard St. Jean, both of North Vancouver, Canada, assignors to C. H. Anderson and Associates Ltd., North Vancouver, Canada

Filed May 2, 1977, Ser. No. 792,870
Int. Cl.[2] B66D 1/00
U.S. Cl. 254—186 R 9 Claims



1. A winch comprising:

(a) a rigid housing having first and second spaced apart side walls, one of said side walls having a plate detachably secured thereto and providing a portion of said one of said side walls;

(b) a hub having a pair of spaced apart relatively large diameter circular bearing lands on the outer surface of said hub and journalled for rotation respectively on said first and second side walls, one of said bearing lands being journalled for rotation on said plate, said hub having a central

web formed integrally to said hub and said web consisting of a flat face surface positioned in a plane transverse to the axis of rotation of the hub for mounting a winch drum;

(c) teeth formed integrally with the hub and projecting outwardly therefrom at a position between said bearing lands and said teeth providing a gear only slightly larger in diameter than said bearing lands;

(d) a worm gear journalled for rotation in said housing and meshing with said teeth in drive relation;

(e) bearing faces extending outwardly from the hub respectively on opposite sides of the teeth and engageable with the side walls of the housing limiting axial displacement of the hub;

(f) an opening in one of said side walls exposing said hub therethrough; and

(g) said winch drum being detachably secured directly to the web of the hub and cantilevered therefrom, said winch drum being disposed exteriorly of the housing for winding a cable thereon.

4,176,828

FLAME CUTTING ARRANGEMENT

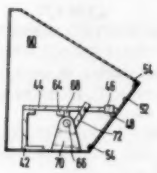
Gerhardt Lange, Frankfurt am Main, Fed. Rep. of Germany, assignor to Messer Griesheim GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed Feb. 22, 1978, Ser. No. 880,039

Claims priority, application Fed. Rep. of Germany, Feb. 25, 1977, 2708140

Int. Cl.² B23K *37/04*

U.S. Cl. 266—65 **6 Claims**



1. In a flame cutting arrangement consisting of a flame cutting machine with a transverse track on which one or more burner carriages carrying cutting torches are mounted so as to be transversely movable and with drive means which are longitudinally movable on guide rails being disposed on both sides of the transverse track and with a support table for holding the workpieces to be processed and being installed underneath the transverse track and between the guide rails, the improvement being hollow feet supporting said support table, a smoke gas suctioning arrangement being provided in said feet, said feet extending along the entire length of said table, openings on the inner side of said feet for communicating with the inner space of said support table beneath the workpiece, each of said openings being closable by a shield, said shield being installed on the inside of the feet wherein said openings are located, each shield being adjustable by means of an adjusting mechanism for determining selectively its open and closed positions, said adjusting mechanism including a lever pivoted at its one end and its free end gripping a shield cam mounted on said shield, a spring resiliently urging said lever in the closed position, and said lever being mounted for being swung by a lever actuating cam which is attached to a shaft extending into said hollow feet.

4,176,829

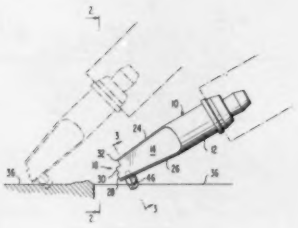
BURNER TIP DRAG GUIDE

Jack B. Dixon, 7102 Fircrest Ave., Sebastopol, Calif. 95472

Filed Jan. 13, 1978, Ser. No. 869,100

Int. Cl.² B23K *7/10*

U.S. Cl. 266—66 **5 Claims**



1. In a burner tip used in a metal cutting operation for cutting a channel therein, having an elongated nozzle terminating in an end portion forming gas jets, the improvement comprising:

a drag guide means comprising a ring shaped support member;

a first beveled gun sight drag member mounted on a surface thereof and extending outwardly therefrom;

said support surface forming rounded shoulder members adjacent said gun sight and disposed along either side thereof;

releasable coupling means normally connecting said support and the end portion of said burner tip for mounting said gun sight on the lower surface of said burner tip extending downwardly therefrom in a vertical plane containing the longitudinal axis thereof said coupling means further comprising means cooperable between the inner surface of said support and the outer surface of said burner tip for rotatably mounting said support on said burner surrounding the tip thereof whereby said gun sight will normally ride in the channel cut by said burner and said shoulders will ride on the edges thereof.

4,176,830

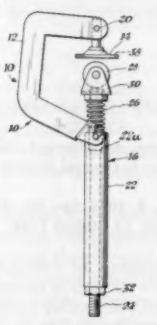
TIE DOWN CLAMP FOR VEHICLE MOUNTED CAMPER HOUSING

John C. Isley, 599 SW. 132 Ave., Fort Lauderdale, Fla. 33325

Filed Mar. 13, 1978, Ser. No. 886,045

Int. Cl.² B25B *1/04*

U.S. Cl. 269—6 **2 Claims**



1. A work clamp for holding two objects together, comprising:

a U-shaped body;

a first pivotal connector connected at one end of said U-shaped body;

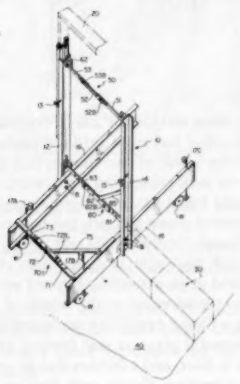
a locking arm pivotally connected to the other end of said U-shaped clamped body;
a roller rotatably mounted at one end of said locking arm;
a locking arm housing;
a shaft mounted within said housing, said roller being connected at one end to said shaft; and
a spring mounted on said shaft between said housing and said roller whereby said shaft and roller are movable longitudinally and are in spring tension.

4,176,831

TEMPLATE FOR SUPPORTING A DOOR FRAME

Alphonso Adams, Washington, D.C., assignor to Helen H. Adams, Washington, D.C., a part interest

Filed Jul. 14, 1978, Ser. No. 924,558
Int. Cl.[2] E04F *21/04*
U.S. Cl. 269—17 7 Claims



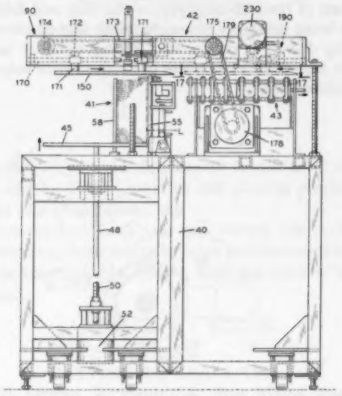
1. A support for positioning a door frame adjacent to an opening in a wall comprising:
two substantially horizontal support members spaced relative to each other by at least first adjustment bar;
said first adjustment bar being adjustable in predetermined incremental units to incrementally space said substantially horizontal support members apart by a predetermined distance;
a substantially vertical support member attached to and projecting upwardly from each of said substantially horizontal support members, said substantially vertical support members being spaced relative to each other by at least one second adjustment bar;
said second adjustment bar being adjustable in predetermined incremental units to incrementally space said substantially vertical support members apart by a predetermined distance;
said predetermined incremental spacing between said substantially horizontal support members being selectively equal to said predetermined incremental spacing between said substantially vertical support members; and
said substantially vertical support members being channel shaped to receive a door frame therein and frame holding means being operatively positioned to releasably secure the door frame thereto.

4,176,832

METHOD AND APPARATUS FOR HANDLING, POSITIONING AND ASSEMBLING FABRIC PLIES

Francis H. Hughes, North Troy; Kenneth O. Morton, Troy; Roger LeMere, Petersburg, and Fred A. Brown, III, Ballston Spa, all of N.Y., assignors to Cluett, Peabody & Co., Inc., New York, N.Y.

Filed May 26, 1976, Ser. No. 689,995
Int. Cl.[2] B65H *5/00*
U.S. Cl. 271—10 28 Claims



1. The method of transporting, aligning and orienting a fabric ply, which comprises
(a) depositing the ply on a generally flat, movable shutter plate, with the leading edge of the ply having a random orientation and alignment with respect to the shutter plate,
(b) advancing the shutter plate, in a direction generally at right angles to the leading edge of the ply, toward a load station,
(c) in the region of the load station, sensing the leading edge of the ply independently at relatively widely spaced positions near the ends,
(d) restraining further advance of the ply in the region of a first one of the sensing positions when the leading edge is sensed at such position, while continuing to advance the shutter plate, and
(e) restraining further advance of the ply in the region of a second one of the sensing position when the leading edge is sensed at such position,
(f) whereby the leading edge of said ply is aligned and oriented in a predetermined manner with respect to the load station.

4,176,833

APPARATUS FOR ADJUSTING PRINTING PRESS FOR CHANGES IN PAPER SIZE

Paul Heimlicher, Bolligen, Switzerland, assignor to Maschinenfabrik WIFAG, Bern, Switzerland

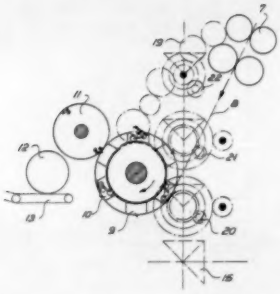
Filed Mar. 6, 1978, Ser. No. 883,471
Claims priority, application Sweden, Mar. 7, 1977, 7702541
Int. Cl.[2] B65H *45/16*
U.S. Cl. 270—71 10 Claims

1. Apparatus for adjusting a folding system for different size sheets of paper, or the like, severed from a web thereof and advancing in a path through the system comprising:
a machine frame;
a rotatable machine shaft for operating various elements of said system;
means for printing the web;
a folding apparatus for different size sheets of paper, or the like, said folding apparatus being located downstream in

the path of the web from said means for printing the web; said folding apparatus comprising:

a cutting group, including a cutting roller rotatably supported to said frame; a drive connection to said cutting group from said machine shaft and said drive connection being invariable in its rotational phase with respect to said machine frame;

said folding apparatus further comprising a folding cylinder rotatably supported to said frame and including means for folding a sheet of the web; said folding cylinder being downstream from said cutting group in the path of the sheets of the web of paper, or the like; said folding cylinder being drivingly connected with said machine shaft for being driven to rotate; said folding cylinder being rotatably adjustable in its phase of rotation with respect to said machine frame;



said folding apparatus still further comprising a gripper cylinder for gripping the sheets of the web going past it and being rotatably supported to said frame and being coaxial with said folding cylinder; said gripper cylinder being drivingly connected with said machine shaft for being driven to rotate; said gripper cylinder being rotatably adjustable in its phase of rotation with respect to said folding cylinder around their respective axis;

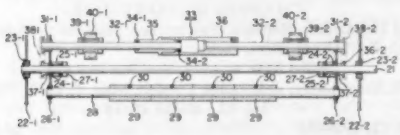
adjusting means for simultaneously adjusting the phase of rotation of both of said folding cylinder and said gripper cylinder in one operation with respect to the phase of rotation of said cutting roller; said adjusting means being operable for adjusting said cylinders at least while said cylinders are being rotated by said machine shaft.

4,176,834

SHEET TRANSFER DEVICE

Yuji Takahashi, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 28, 1977, Ser. No. 837,373
Claims priority, application Japan, Oct. 1, 1976, 51-118336
Int. Cl.[2] B65H *3/06*
U.S. Cl. 271—116 **12 Claims**



4. A sheet transfer device comprising:

first arm means rotatably mounted at a position;

second arm means rotatably mounted at a different position;

a first supporting shaft rotatably mounted on said first arm means;

a second supporting shaft rotatably mounted on said second arm means;

connecting means for connecting said first and second supporting shafts in mutually rotatable and axially aligned relationship;

a first sheet transfer roller rotatably mounted on said first supporting shaft;

a second sheet transfer roller rotatably mounted on said second supporting shaft;

first driving means for rotationally driving said first supporting shaft; and

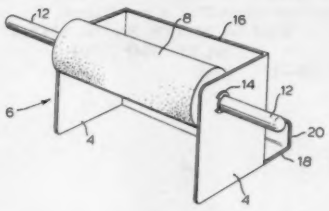
second driving means for rotationally driving said second supporting shaft.

4,176,835

SIT-UP EXERCISING DEVICE

Edward D. Aziz, 47 Crosland Ave., Scarborough, Ontario, Canada

Filed Jan. 16, 1978, Ser. No. 869,586
Int. Cl.[2] A63B *21/00*
U.S. Cl. 272—93 **1 Claim**



1. An exercising device for use in conjunction with a door, comprising a roller having a resilient surface and a length at least equal to the width of two human feet; a frame having side walls and a rear wall presenting a rearward facing door engaging surface, said frame having a floor engaging footing extending in a horizontal plane beneath the roller; a shaft supporting the roller between the side walls and having coaxial extensions passing through said side wall to form elongated generally cylindrical hand grips extending beyond each of the side walls by a distance at least equal to the width of a human hand, the frame having a flange extending rearwardly of the rear wall in the same horizontal plane as said footing and engageable with the bottom of a door, and a further flange upstanding from said rearwardly extending flange and having a forward facing vertical door engaging surface, the frame being so configured that when the rear wall and the flanges are engaged with the faces and bottom of a door and the floor engaging footing is engaged with a floor beneath the door, said roller and said hand grips are supported for rotation on a common axis parallel to and adjacent the bottom of the door and the floor therebeneath in a position such as to allow unobstructed access to said roller and said hand grips respectively by the insteps and palms of a user with said rear wall providing a rest for the soles of a user's feet when the user's insteps are engaged beneath the roller.

4,176,836

VARIABLE RESISTANCE EXERCISING APPARATUS AND METHOD

Randy Coyle, 19 High St., Glen Ridge, N.J. 07028

Filed Jun. 21, 1977, Ser. No. 808,638
Int. Cl.[2] A63B *21/00*
U.S. Cl. 272—120 **4 Claims**

1. Exercising apparatus providing a discrete variable resistance commensurate with the strength curve of the body muscles being exercised, and commensurate with the strength of an exerciser and the desired intensity of the exercise being performed, comprising

a frame including an inclined plane which is discretely curved so that the angle of incline varies instantaneously and automatically;

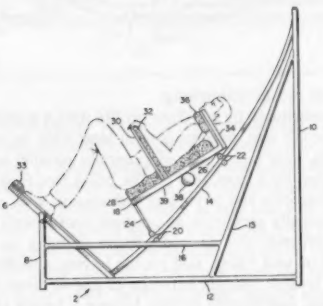
a carriage displaceably carried by the frame and supporting the body of the exerciser;

the carriage carrying a weight commensurate with the strength of the exerciser and the desired intensity of the exercise being performed;

means supported by the frame and the exerciser exerting a force in one sense against said means to displace the carriage in he opposite sense up the inclined plane; and

the exerciser encountering a discrete variable resistance when displacing the carriage up the inclined plane, said resistance varying instantaneously and automatically with the sines of the varying angles of incline and with the strength curve of the body muscles being exercised, and with the strength of the exerciser and the desired intensity of the exercise being performed.

4. A method whereby an exerciser performs an exercise having a discrete variable resistance commensurate with the strength curve of the body muscles being exercised and com-



mensurate with the strength of the exerciser and the desired intensity of the exercise, comprising:

providing an inclined plane which is discretely curved so that the angle of incline varies instantaneously and automatically;

displaceably supporting a carriage on the inclined plane;

positioning the body of the exerciser on the carriage and the exerciser exerting a force for displacing the carriage up the inclined plane;

the exerciser encountering a discrete variable resistance to the carriage displacement, said resistance varying instantaneously and automatically commensurate with the sines of the varying angles of incline and also varying commensurate with the strength curve of the body muscles being exercised, and with the strength of the exerciser and the desired intensity of the exercise; and

the exerciser varying the force exerted for overcoming the varying resistance.

4,176,837

ARM-WRESTLING APPARATUS

Lawrence W. Jeffrey, 1008 Juanita, and Robert D. Jeffrey, 7121 Lowell Ave., both of Glendora, Calif. 91740

Continuation-in-part of Ser. No. 617,428, Sep. 29, 1975, abandoned. This application Aug. 1, 1977, Ser. No. 820,585

Int. Cl.[2] A63B *71/06*

U.S. Cl. 273—1 R **7 Claims**

1. Arm-wrestling amusement apparatus comprising:

a coin acceptor,

a table-like playing surface,

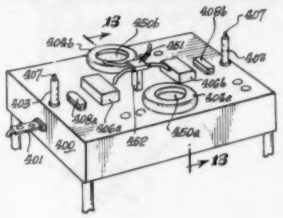
a pair of elbow rest cups thereon, each having a flat central pad portion and a surrounding cup rim portion,

a pair of depressable touch pads for scoring, each linked to an electrical pad switch operable in response to depression thereof,

electrical signal means actuably connected to each said pad switch,

lockout means with a lockout element movable to prevent use of said apparatus for arm-wrestling,

motor drive means to drive said lockout element between a lockout play-preventing position and an unlocked playing position,



a connection from said coin acceptor to said drive means to drive said lockc ·t element to said playing position upon receipt of a coin therein, and

a connection from each said pad switch via a reversing means to said drive means to drive said lockout element to said lockout position after a said pad switch has been actuated.

4,176,838

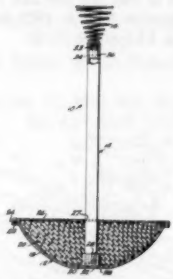
BATTING BASEBALL TEE

Jacqulyn G. Griffin, 60 Helen La., Fort Myers Beach, Fla. 33931

Filed Oct. 17, 1977, Ser. No. 842,942

Int. Cl.[2] A63B *69/40*

U.S. Cl. 273—26 E **1 Claim**



1. A batting base ball tee device comprising a self uprighting base member comprised of an upwardly hollow shell, providing a hemi-spherical bottom, with a flattened central area, said shell being filled with a suitable heavy material,

a post of a predetermined height having a top end, and a screw threaded lower end engaged in an internally screw threaded receptacle fixed centrally and interiorly of said shell,

an inverted conical helical spring fixed to said top end in an axial relation to said post and shell for nestingly receiving a ball.

4,176,839

WRIST SUPPORT

Alan E. Pinkus, 4 Albert St., Brighton, Victoria, Australia

Filed May 1, 1978, Ser. No. 901,846

Claims priority, application Australia, May 2, 1977, PC9934

Int. Cl.[2] A63B *69/38*

U.S. Cl. 273—29 A **8 Claims**

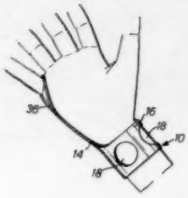
1. In a wrist support device for use in tennis comprising:

a band of a breathable flexible material

means to permit fastening of said band about a persons wrist; and

an integral protruding portion extending from the band in a direction to engage and support the side edge of a person's hand between the wrist and smallest finger;

the improvement wherein the protruding hand engaging



portion extends from the band at an angle to the band in the range 45° to 80° in the plane of the flattened band, and means biasing said protruding portion to an equilibrium position out of said plane on the side of the band to be occupied by the hand, the force required to cause said protruding portion to occupy said plane being greater than ½ kgm force.

4,176,840

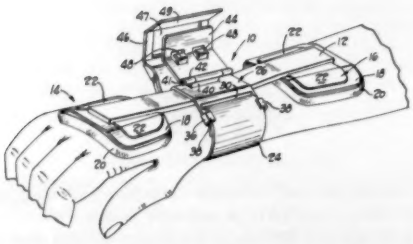
WRIST SUPPORT

Michael E. Lanning, 15734 Hummel Rd., Brook Park, Ohio 44132

Continuation-in-part of Ser. No. 469,213, May 13, 1974, abandoned. This application Mar. 6, 1978, Ser. No. 883,540

Int. Cl.[2] A63B *69/00*

U.S. Cl. 273—54 B **1 Claim**



1. A brace for supporting the wrist of a sportsman comprising: a rigid bar; a pair of support members disposed at opposite ends of said rigid bar, a first of said support members substantially conforming to the shape of a back of a hand, a second of said support members substantially conforming to the shape of a portion of a forearm; fastening means disposed between said first and second support members securing said bar to the user's arm at the wrist, said fastening means including strap means capable of attaining a plurality of lengths in order to adjust to the size of the wrist, a first end of said strap means permanently attached to said rigid bar by a clip, and a second end of said strap means having a clamping means attached thereto; a latching means which cooperates with said clamping means to releasably attach the second end of the strap to said rigid bar; and said brace is mounted on the user's arm by means of said strap encircling the wrist thereof, wherein said clip includes a hinge, and said latch means is connected to the clip at the hinge so that it can rotate about the hinge.

4,176,841

TENNIS RACKET

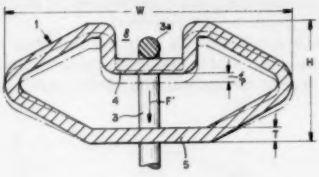
Reinhold Sommer, Helgolandring 68, 43 Essen 1, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 720,413, Sep. 3, 1976, abandoned, which is a continuation of Ser. No. 566,391, Apr. 19, 1975, abandoned. This application Feb. 28, 1978, Ser. No. 882,055

Claims priority, application Fed. Rep. of Germany, Apr. 10, 1974, 2417439

Int. Cl.[2] A63B *49/12*

U.S. Cl. 273—73 H **5 Claims**



1. A tennis racket comprising:

a frame constituted by a hollow profile with a wall thickness of 0.6 to 0.8 mm, consisting to at least 95% by weight of titanium, bent into a pair of generally parallel legs interconnected by a loop, said profile being free from internal reinforcements and having an indentation with a flat bottom generally parallel to an opposite profile wall and with sides perpendicular to said bottom defining an external groove on said frame, said profile having a width parallel to said bottom ranging between 25 and 40 times said wall thickness, said profile further having a height transverse to said bottom ranging between 5 and 20 times said wall thickness;

a web bridging said legs and complementing said loop to a substantially elliptical head;

strings partly received in said external groove and secured to said frame and said head; and

a handle interconnecting extremities of said legs remote from said head.

4,176,842

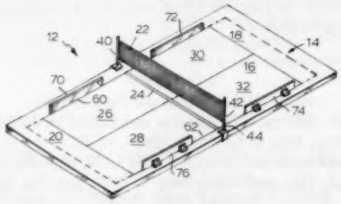
ROLLING BALL GAME

Alcíbiades D. Zaldivar, 2974 SW. 23 St., Miami, Fla. 33145

Filed Aug. 17, 1978, Ser. No. 934,587

Int. Cl.[2] A63F *67/04, 7/06*

U.S. Cl. 273—85 R **4 Claims**



1. A simulated tennis game comprising a gameboard having a flat upper surface, indicia on said upper surface defining a playing field and separating said field into a first and a second court along a mid-court line and a net spanning said mid-court line above said playing field a first predetermined dimension and standards to support said net including means to connect to said gameboard and side boundary indicia for said courts and wall members vertically oriented along said side boundary indicia and hinge means to connect the wall members to said gameboard for swinging movement away from said courts and

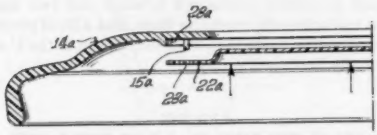
a playing ball of spherical form of a diameter less than said predetermined distance.

4,176,843

AERODYNAMIC THROWING DISC

Leslie DeWitt, Jr., 9820 Rush St., S. El Monte, Calif. 91733

Continuation of Ser. No. 745,871, Nov. 29, 1976, abandoned.
This application Jan. 11, 1978, Ser. No. 868,476
Int. Cl.[2] A63H *27/00*
U.S. Cl. 273—106 B **4 Claims**



1. An aerodynamic throwing disc comprising:

a relatively thin walled annular rim having a circular central opening, a radially outer edge portion which curls toward one side of the rim to define a circumferential lip about the rim, and an annular shoulder at said one side of said rim concentric with and spaced outwardly from the edge of said opening to define an annular seat about the opening,

a circular insert element of uniform thickness thinner than said rim, said insert having an outer radially extending flat annular flange configurated to seat against the annular seat of the rim, and having a raised central portion spaced from the flange by an axially extending side wall, said central portion extending into said opening with its flange engaging the annular seat, and bearing indicia on its surface opposite from said rim annular seat, and

means joining said insert flange to said rim portion.

4,176,844

MULTI-STATION PINBALL GAME

Allen L. Ryan, Chicago; Eric G. Jansons, Schaumburg, both of Ill.; Ronald D. Halliburton, Fort Lauderdale, and James H. Pearson, Sunrise, both of Fla., assignors to Midway Mfg. Co., Franklin Park, Ill.

Filed Jan. 31, 1978, Ser. No. 873,908
Int. Cl.[2] A63F *7/00*
U.S. Cl. 273—121 A **7 Claims**

2. A pinball game apparatus comprising:

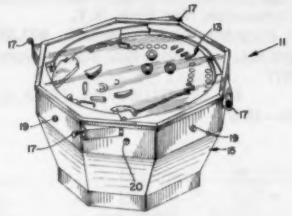
a cabinet;

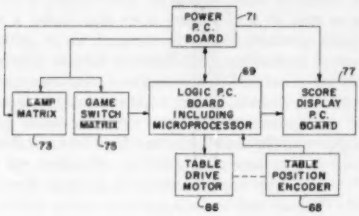
a playfield having a single play initiating position, said playfield being mounted on said cabinet and rotatable relative to said cabinet;

a plurality of discrete playing stations stationarily disposed in spaced relation at fixed positions on said cabinet adjacent said playfield;

a plurality of manually operable shooter means, a shooter means being stationarily located at each of said discrete playing stations; and

an indexing driver means including data processor control means, said data processor control means being programmable to rotate said playfield and selectively stop said playfield to accurately align said play initiating position with the shooter means of an associated playing station in a desired sequence for permitting the respective player at





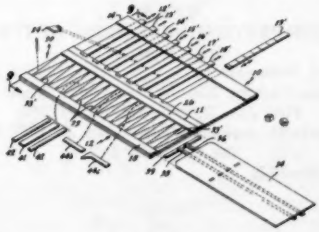
each playing station to take a turn at playing said pinball game.

4,176,845

APPARATUS FOR PLAYING A SIMULATED GOLF GAME

John T. Lancaster, 8566A 23 Van Ness St., Huntington Beach, Calif. 92646

Filed Jun. 17, 1977, Ser. No. 807,544
Int. Cl.[2] A63F *7/06*
U.S. Cl. 273—245 **6 Claims**



1. Apparatus adapted for playing a simulated golf game, in combination, chart means, graphics including alignments of numbers including columns and rows of numbers, one alignment having numbers representing yardages and the other alignment having numbers representing chance numbers whereby a yardage can be derived from a particular chance number, the said chart means having an additional alignment of numbers and identifying indicia adapted for identifying particular hazards and penalty conditions with particular numbers of the said chance numbers, identifying indicia including individual removable indicator members positionable with respect to individual chart numbers to indicate hazards and penalty conditions, the said members being constructed to be positioned to be identified by way of a chance number so as to indicate a player has been subjected to a hazard or penalty condition.

4,176,846

ACTUATING MECHANISM FOR A RECORD CHANGER WITH A STACKING SPINDLE

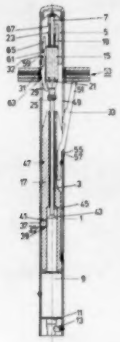
Gerhard Freiter, Berlin, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 18, 1978, Ser. No. 907,303

Claims priority, application Fed. Rep. of Germany, May 21, 1977, 2723077

Int. Cl.[2] G11B *17/04, 17/12*

U.S. Cl. 274—10 S **8 Claims**



1. An actuating lever mechanism for a record changer having a changer command means, and a stacking spindle having a single actuating rod for record dropping functions, comprising

a chassis,

a pulling lever movably mounted to said chassis, having a lever free end,

means for moving said stacking spindle actuating rod responsive to movement of said free end,

first means for moving said free end in a first direction in response to scanning of a first track on a command means, and

second means for moving said free end in a second direction opposite said first direction in response to scanning of a second track on the command means.

4,176,847

DEVICE FOR PREVENTING SLIPPING OF TURNTABLE OUT OF SHAFT

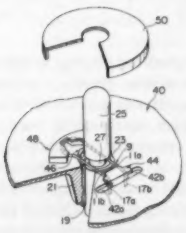
Norio Akai; Nobumasa Inoue, and Kazuo Ohtani, all of No. 1006, Oaza Kadoma, Kadoma City, Osaka, Japan

Filed Jan. 27, 1978, Ser. No. 872,753

Claims priority, application Japan, Jan. 31, 1977, 52-10005

Int. Cl.[2] G11B *3/60*

U.S. Cl. 274—39 R **3 Claims**



1. A device for preventing slipping of a turntable off a shaft by limiting relative axial movement of the turntable having a boss fixed thereto and the shaft rotatably extending through said boss, the turntable having a generally U-shaped spring having two leg portions terminating in bent ends, respectively, the turntable having integrally formed therewith slot means for receiving the bent ends of the U-shaped spring and a plurality of support projections engaging the generally U-shaped retainer spring to mount the generally U-shaped retainer spring to the turntable, the plurality of support projections and the slot means being configured and arranged such that the generally U-shaped retainer spring is arranged so that the leg portions thereof extend substantially parallel to each other and across a circular axial of end of said boss, the shaft being formed with a radial groove which receives the leg portions of the generally U-shaped retainer spring, said plurality of projections comprising

a first projection, having two opposed faces, which is interposed between said two leg portions by internally and bearingly engaging said two leg portions, respectively, and two lateral portions extending from said two opposed faces respectively;

a second projection interposed between said two leg portions and internally engaging them; and a third projection formed with a space to receive the bottom of the U of said generally U-shaped spring.

4,176,848

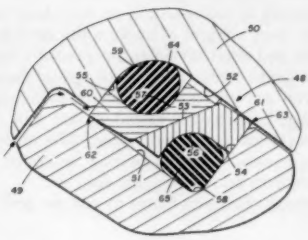
ROTARY BEARING SEAL FOR DRILL BITS

David S. Lafuze, Arlington, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Jun. 30, 1978, Ser. No. 920,862

Int. Cl.[2] F16J *15/16*

U.S. Cl. 277—92 **7 Claims**



1. A rolling cone cutter earth boring bit, comprising:

a bit body;

a cantilevered bearing pin extending from said bit body;

a rolling cone cutter rotatably mounted on said bearing pin;

a seal envelope between said bearing pin and said rolling cone cutter;

a first annular substantially rigid ring positioned around said bearing pin and located in said seal envelope, said first annular substantially rigid ring having a first sealing surface that is inclined with respect to said bearing pin;

a first substantially resilient ring positioned around said bearing pin and located in said seal envelope;

a second annular substantially rigid ring positioned around said bearing pin and located in said seal envelope, said second annular substantially rigid ring having a second sealing surface that is inclined with respect to said bearing pin; and

a second substantially resilient ring positioned around said bearing pin and located in said seal envelope, said first and second annular rigid rings and resilient rings cooperating when said rolling cone cutter is mounted on said bearing pin whereby said first and second resilient rings urge said first and second sealing surfaces of said first and second annular rigid rings into sliding contact as said cone cutter rotates about said bearing pin thereby providing a sliding interface between said first and second annular rigid rings with said sliding interface being inclined to said bearing pin thereby minimizing the size of said seal envelope.

4,176,849

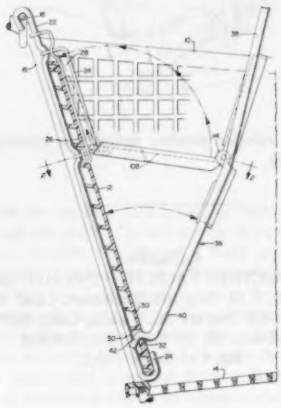
PLASTIC CHILD SEAT BACK FOR CART

Houston Rehrig, 1401 S. Oak Knoll Ave., Pasadena, Calif. 91109

Continuation-in-part of Ser. No. 681,462, Apr. 29, 1976, Pat. No. 4,065,142. This application Apr. 28, 1977, Ser. No. 792,052

Int. Cl.[2] B62B *3/02*

U.S. Cl. 280—33.99 B 6 Claims



1. A child seat for a grocery cart or the like having a rear cart panel, comprising:

a movable plastic seat back frame having a lower portion terminating in at least one downwardly curved mounting member,

at least one opening in the lower portion of said rear cart panel for closely receiving said curved member, whereby said seat back frame is pivotally movable between an open position pivoted away from said cart rear panel and a closed position adjacent to said cart rear panel,

a seat panel pivotally attached at one end to said seat back frame and movably attached at the other end to said cart rear panel,

said curved member having a terminal portion substantially parallel to said seat back frame and said opening is oriented substantially perpendicular to said rear cart panel, whereby said curved member can be installed in said opening only when said seat back frame is substantially perpendicular to said rear cart panel, said seat back frame being pivoted upwardly therefrom to an operating position and not disengageable in that position, and whereby said curved member can be removed from said opening only when said seat back frame is substantially perpendicular to said rear cart panel,

wherein said seat back frame further comprises at least one laterally extending opening defined in part by an upper edge, and further comprising seat panel attachment means including a support rod installed in said opening and spaced from said upper edge and a hook extending from said one end having a recess in which said support wire is received, said hook having an opening substantially perpendicular to said seat panel, the distance between said upper edge and said support wire being less than the length of a terminal portion of said hook, whereby said hook can be engaged with said support wire only when said seat panel is oriented downwardly substantially parallel to said seat back frame, and said seat panel cannot be disengaged from said support wire when pivoted upwardly to substantially a horizontal position.

4,176,850

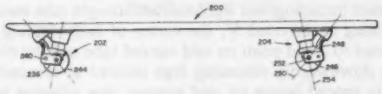
SKATEBOARD TRUCK WITH INDEPENDENT WHEEL SUSPENSION

Robert D. Johnson, 7882 Cedar Lake Ave., San Diego, Calif. 92119

Continuation-in-part of Ser. No. 844,973, Oct. 25, 1977. This application Jun. 22, 1978, Ser. No. 917,872

Int. Cl.[2] A63C *17/02*

U.S. Cl. 280—87.04 A 10 Claims



1. In a wheel truck having wheels mounted for rotation about a wheel axis on a yoke which in turn is adapted for mounting on an elongate moveable platform along a support axis which extends through the longitudinal centerline of the platform said yoke being pivotable relative to the platform, the improvement comprising a pair of laterally spaced swing arms having distal ends for rotatably mounting the wheels, and means for mounting the proximal ends of the swing arms on the yoke for resiliently yieldable independent movement of their distal ends through arcs about a transverse axis, with the distal ends of the swing arms disposed so that the axes of rotation of the wheels substantially normally intersect the support axis so that a portion of the weight on the platform is carried through the support axis over the wheels.

4,176,851

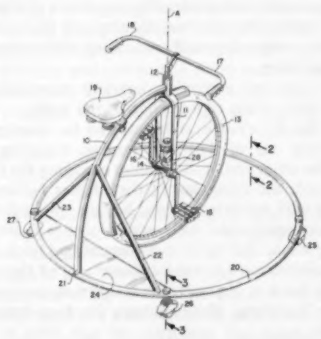
CHILD'S BUMPER BIKE

Robert C. Simonson, 258 N. Arnez, Minor Oaks, and Ruben J. Stroud, 602 N. Fulton, both of Ojai, Calif. 93023

Filed Jul. 20, 1978, Ser. No. 926,409

Int. Cl.[2] B62K *9/00*

U.S. Cl. 280—259 2 Claims



1. A child's bumper cycle that cannot tip over including, in combination:

(a) a cycle frame;

(b) a steering fork journalled in a forward end of said frame for steering movements about a generally vertical axis;

(c) a single wheel rotatably mounted in said steering fork;

(d) pedals on said wheel;

(e) handlebars secured to said steering fork;

(f) a seat mounted on a portion of said frame to the rear of said handlebars;

(g) an integral bumper ring secured to said frame in a horizontal plane at a given distance above the ground below said steering fork and including a resilient cushioning material;

(h) four individual caster wheels coupled to said ring at 90° circumferentially spaced positions engaging the ground to inhibit tipping over of said cycle frame and also serve as a 360° bumper; and

(i) a rear platform secured to an arcuate rear portion of said bumper ring, the forward edge of said platform lying on a chord of said ring, said cycle frame including a single curved tube member lying in a vertical plane having one end secured to the central rear portion of said bumper ring and its other end extending upwardly and forwardly to terminate in the journal for said steering fork, said frame further including rear right and left straight tube members forming an inverted V, the vertex of said V being connected to a mid point on said curved tube and the diverging downwardly extending legs secured at circumferentially spaced points on said bumper ring adjacent to the terminal points of said chord to stabilize said curved tube member.

4,176,852

HITCH ADAPTOR

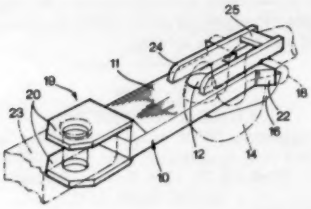
John Collin, Deene, Near Corby, England, assignor to Massey-Ferguson Services N.V., Curacao, Netherlands Antilles

Filed Jan. 14, 1977, Ser. No. 759,509

Claims priority, application United Kingdom, Jan. 21, 1976, 02266/76

Int. Cl.[2] B60D *1/04*

U.S. Cl. 280—415 A **3 Claims**



1. A hitch assembly for connecting together a towing vehicle having a hook with a rearwardly disposed free end and a towed vehicle having a forwardly extending draw tongue; said assembly comprising:

cylindrical structure extending laterally outwardly from opposed sides of the root portion of the hook;

an adapter having a clevis at its rear end for attachment to the forward end of the draw tongue, engaging means toward the other end of the adapter engaging the free end of the hook, the other end of the adapter further being provided with additional means having opposed longitudinally extending side walls which cooperate with said engaging means and the root portion of said hook and the cylindrical structure to inhibit movement of the adapter when the hook is engaged, the adapter in use lying in a generally horizontal plane between the draw tongue and the hook.

4,176,853

QUICK DISCONNECT TRAILER HITCH

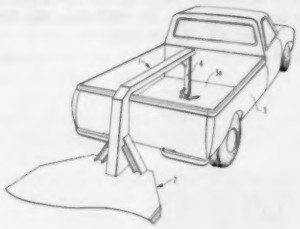
James H. Brock, Rte. No. 2, Box 194, Brigham City, Utah 84302

Filed Jul. 21, 1978, Ser. No. 926,792

Int. Cl.[2] B62D *53/04*

U.S. Cl. 280—423 R **7 Claims**

1. A trailer hitch comprising, a tubular member connected to a trailer, a pair of jaws, said jaws having complementary concave surfaces adapted to surround a ball hitching element connected to a tractor vehicle, said jaws being slidably mounted in said tubular member, spring means mounted in said tubular housing for biasing the jaws outwardly of the tubular member to a position wherein the jaws are moved to an open position, a pin oriented between the jaws for guiding said jaws during movement relative to said tubular member, and latch means connected to said tubular member for holding the jaws



inwardly of the tubular member against the biasing force of said spring means.

4,176,854

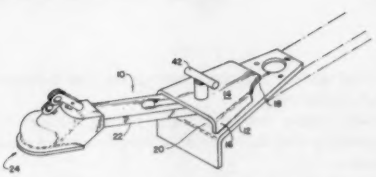
CONNECTION FACILITATING HITCH

Wayland W. Hill, P.O. Box 168, Earlimart, Calif. 93319, and Gary L. Hill, 1408 Demare St., Visalia, Calif. 93277

Filed Jun. 19, 1978, Ser. No. 916,803

Int. Cl.[2] B60D *1/00*

U.S. Cl. 280—478 R **5 Claims**



1. In a hitch characterized by a housing having a horizontally oriented bottom plate, a horizontally oriented top plate, a horizontally oriented throat and a displaceable coupling arm extended axially from the throat, the improvement comprising:

A. means connecting said arm to said housing supporting the arm for displacement in axial directions from an extended position to a retracted position and for pivotal displacement in directions transversely related to said axial directions including an elongated slot defined in said arm and a retainer pin extended vertically through the slot;

B. means for securing said arm against axial displacement from said retracted position including a bolt receiver comprising a bore defined in the arm in communicating relation with the slot, and a locking bolt integrally related to said retainer pin characterized by a cylindrical wall surface defining a cam surface and an annular bearing surface concentrically related to said bolt, said bolt being adapted to be disposed in coaxial alignment with said bore when the arm is in said retracted position, guide means for establishing coaxial alignment between said bore and said bolt as the arm is displaced toward said retracted position including a relief having a vertical wall defining a cam follower surface for engaging said cam surface, whereby the arm is laterally positioned relative to the bolt as the arm is retracted, and a planar bottom surface for engaging said bearing surface, and a bolt actuator for driving said bolt into said bore in response to the bore being positioned in coaxial alignment with said bolt; and

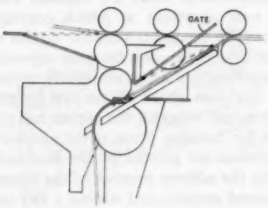
C. means for securing said link against pivotal displacement including means defining in said housing a second throat disposed in coaxial alignment with said first throat for receiving in confining relation an end portion of the arm.

4,176,855

GATE DEVICE

James R. Ingram, Jr., Dallas, and George A. Kiesel, Irving, both of Tex., assignors to Recognition Equipment Incorporated, Dallas, Tex.

Filed Nov. 13, 1978, Ser. No. 960,211
Int. Cl.[2] G06K *13/07*; B65H *5/22*
U.S. Cl. 235—480 5 Claims



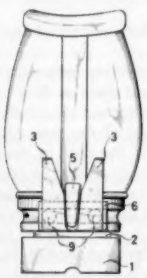
1. A gate device in a reversible document transport positioned across the path of a belt driven document guide comprising; two flexible fingers and a body portion, said body portion rigidly attached to said transports and said fingers extending from said body portion across the document guide so that documents moving in one direction will flex the fingers aside allowing the document to pass along the document guide, said fingers returning to a position across the guide after the document passes and diverting documents to another path when the documents move in an opposite direction.

4,176,856

BINDING FOR CROSS-COUNTRY SKIS

Hans E. Glaser, Ringstrasse 9, D-8591 Wiesau, Fed. Rep. of Germany

Filed Jul. 11, 1978, Ser. No. 923,694
Claims priority, application Fed. Rep. of Germany, Feb. 25, 1978, 2808131
Int. Cl.[2] A63C *11/12*
U.S. Cl. 280—611 5 Claims



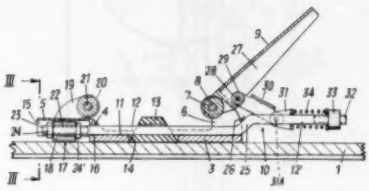
1. An auxiliary binding for cross-country skis, comprising a clasp secured to the side wall of the heel of a ski boot, said clasp having a rounded protuberance positioned in a corresponding groove formed in the heel of the boot, a wedge portion connected to said clasp and extending rearwardly therefrom, said wedge having downwardly converging side walls, a plate secured to the ski, two upstanding prongs integrally connected to one end of said plate, said prongs having upwardly diverging opposed inner edges defining a recess having a width which decreases towards the plate, the upwardly diverging opposed inner edges of the prongs at the upper portions thereof diverging at a substantially greater angle than at the lower portions, said lower portions diverging at an angle corresponding to the downwardly converging side walls of said wedge, whereby the wide upwardly diverging upper portion of the recess provides a guide to facilitate the insertion of the wedge into the lower wedge gripping portion of the recess.

4,176,857

SAFETY SKI BINDING

Roland Bodendorfer, Vienna, Austria, assignor to TMC Corporation, Baar, Switzerland

Filed Mar. 30, 1978, Ser. No. 891,750
Claims priority, application Austria, Apr. 4, 1977, 2325/77
Int. Cl.[2] A63C *9/08*
U.S. Cl. 280—613 10 Claims



1. The combination of a ski boot having a heel with first and second locking surfaces thereon and a safety ski binding releasably operatively connectible to said first and second locking surfaces, said combination comprising:

a base plate adapted to be secured to a ski;

guide means on said base plate;

an elongated pull rod reciprocally guided in said guide means, said pull rod having first ski boot engaging means secured thereto and movable therewith;

tensioning lever means, which includes second ski boot engaging means, operatively connected to said pull rod for effecting a releasable locking engagement of said first and second locking surfaces with said first and second ski boot engaging means; and

upstanding pivot means fixed relative to said ski and means defining a recess in said heel receiving said pivot means therein to facilitate a pivotal support for said heel relative to said ski, said upstanding pivot means being positioned between said first and second ski boot engaging means and on a central longitudinal center line for said base plate.

4,176,858

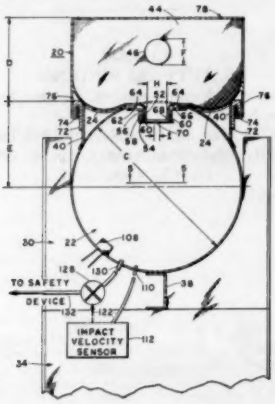
ENERGY ABSORBING BUMPER SYSTEM

Murray Kornhauser, Wynnewood, Pa., assignor to Safety Consultants, Chambersburg, Pa.

Division of Ser. No. 687,513, May 18, 1976, which is a continuation of Ser. No. 430,667, Jan. 4, 1974, Pat. No. 3,971,583, which is a continuation-in-part of Ser. No. 126,155, Mar. 19, 1971, Pat. No. 3,810,668. This application Dec. 17, 1976, Ser. No. 751,841
Int. Cl.[2] B60R *19/10, 21/06*
U.S. Cl. 280—734 20 Claims

1. In a vehicle equipped with at least one inflatable air bag for protecting at least one passenger of the vehicle in case of an accident, wherein an inflation assembly for said bag comprises a pressurized gas tank having a front portion and at least one branch portion in a continuous configuration extending from said front portion of said pressurized gas tank, said branch portion connecting said front portion to said at least one inflatable air bag, said front portion mounted in the front region of the vehicle and extending transversely of the vehicle longitudinal axis from one side to the opposite side of the vehicle; and at least one automatic valve, said one automatic valve connected between the pressurized gas tank and each associated inflatable

air bag, said pressurized gas tank inflating said air bag upon impact during an accident, without the use of separate sensors,



due to a sudden increase in pressure within the gas tank which causes said valve to open.

4,176,859

NON-COUNTERFEITABLE DOCUMENTS

Dennis R. Giordano, Cheektowaga, N.Y., assignor to Safron Printing Company, Detroit, Mich.

Filed May 15, 1978, Ser. No. 905,578

Int. Cl.[2] B42D *15/00*

U.S. Cl. 283—8 R **5 Claims**

1. A process for preventing the counterfeiting of documents through use of office copiers, and comprising preprinting an original document with background which includes an invalidating mark, said mark being effectively camouflaged in the original document as viewed visually but being clearly discernible in xerographic and photocopies made from the original document,

said process including the steps of:

imprinting on said original document a background having two different indicia at two different screen frequencies,

said indicia comprising an invalidating legend printed at a first screen frequency in the range of from about 85 to about 100 lines per inch, and

a background pattern printed at a second screen frequency.

said second screen frequency being higher than said first screen frequency and in the range of from about 130 to about 150 lines per inch, to provide a composite camouflage background,

imprinting a camouflaging pattern on said document, and

overprinting on said background to provide a final document containing selectable information.

4,176,860

STREET ADDRESS LOCATING AID

Eugene W. Fowler, Sun City, Ariz., assignor to Gene Fowler and Friends Inc., Sun City, Ariz.

Filed May 25, 1978, Ser. No. 909,214

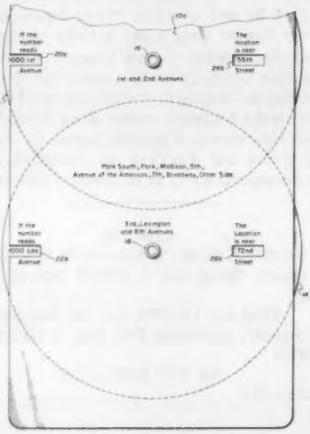
Int. Cl.[2] G09B *29/00*

U.S. Cl. 283—34 **3 Claims**

1. A street address locating aid comprising: a first printed paper disc having a plurality of street addresses printed in first circles on first and second sides thereof and having a plurality of cross streets printed in second concentric circles on the first and second sides;

a second printed paper disc having a plurality of street addresses printed in first circles on first and second sides thereof and having a plurality of cross streets printed in second concentric circles on the first and second sides;

a printed paper carrier having first and second essentially parallel sheets; the first sheet having two street address apertures at which street addresses on the first circles of the first sides of the first and second discs are exposed and having two locations near apertures at which corresponding cross streets from the second concentric circles on the first sides of the first and second discs are exposed; the second sheet having two street address apertures at which street addresses on the first circles of the second sides of the first and second discs are exposed and having two locations near apertures at which corresponding cross streets from the second concentric circles on the second sides of the first and second discs are exposed, wherein the printed paper carrier being essentially rectangular with a width of less than about 10 cm and length of less than about 13 cm, and wherein the carrier has printed thereon a formula for deriving cross street numbers for selected street addresses not printed on the first and second discs by dividing the address number of the street address by a predetermined number and adding a key number for the street listed in the street address, and wherein the carrier



also has printed thereon a list of key numbers for a plurality of streets;

first and second connecting means for rotatably connecting the first and second discs at their respective centers between the first and second essentially parallel sheets of the carrier, the centers of the first and second discs being positioned less than the radii of the respective discs from an edge of the carrier so that an edge of each of the first and second discs extends beyond the edge of the carrier, and the centers of the first and second discs being spaced from one another by less than the sum of the radii of the discs so that the first and second discs overlap within the carrier, and wherein the first and second discs have diameters greater than the width of the carrier; and

wherein the street addresses in the first circles are arranged on the first and second sides of the first and second discs to provide a reference position in which four different streets with the same selected address number are displayed simultaneously through the four street address apertures, thereby providing a point of reference for a user.

4,176,861

BLANK CHECK SYSTEM

Stuart W. MacKiernan, Jr., 216 Messenger St., Canton, Mass. 02121

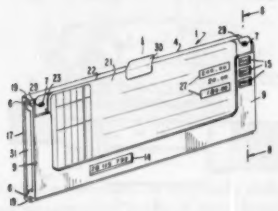
Filed Mar. 13, 1978, Ser. No. 886,227

Int. Cl.[2] B42D *11/00*

U.S. Cl. 283—58 **20 Claims**

1. A check writing system, which includes providing a

plurality of check blanks stacked in a dispenser frame made of plastic material, each check blank having two portions joined at a fold line, the upper portion being a conventional blank check and the lower portion adapted to be a duplicate or record of the check, said system comprising partially withdrawing the topmost check blank from the frame to a predetermined position, and, while said blank is retained in said position, entering thereon the amount of the check being drawn and entering the remaining balance in the account, and thereafter, with the check blank in any convenient position, completing the writing of the check in the usual manner, the remaining balance being inscribed on the next succeeding check blank when the said topmost check blank is fully removed from said dispenser frame.

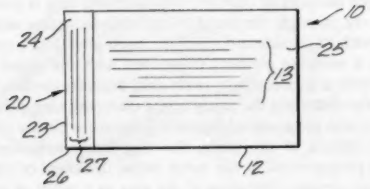


4,176,862

READ-AWAY FLAP

David M. Targe, Woodbury, N.Y., assignor to Newsday, Inc., Garden City, N.Y.

Filed Aug. 11, 1978, Ser. No. 933,110
Int. Cl.[2] B42D *15/00*
U.S. Cl. 283—64 **3 Claims**



1. In a broad sheet newspaper or newspaper section having a plurality of adjacent sheets of newsprint of equal length and width with a vertical fold and a horizontal fold intersecting the vertical fold, the improvement comprising a cover sheet of newsprint equal in length to the adjacent sheets and slightly more than one-half the width of the adjacent sheets, a back portion of the cover sheet overlying and coinciding completely with the back of the newspaper, a first fold in the cover sheet coinciding with the vertical fold to form a front portion substantially narrower than the front of the newspaper, the front portion overlying a narrow band of the front of the newspaper along the vertical fold, and a second fold in the cover sheet intersecting the first fold and coinciding with the horizontal fold.

4,176,863

LARGE DIAMETER DUCTS FOR USE IN THE OCEAN

Sherman B. Wetmore, Westminster, Calif., assignor to Global Marine, Inc., Los Angeles, Calif.

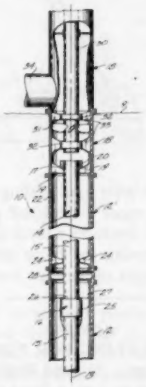
Filed Mar. 15, 1978, Ser. No. 886,904
Int. Cl.[2] F16L *3/00*
U.S. Cl. 285—18 **18 Claims**

1. A large diameter duct structure adapted for vertical disposition in an ocean comprising

an elongate tensile core for the duct adapted to be supported at one end thereof and to be disposed downwardly therefrom,

a plurality of duct wall sections of selected length serially alignable to define a tubular assembly a diameter substantially greater than that of the core,

support means engageable with the core at selected locations along the core and with the wall sections for supporting the wall sections about the core and for securing the wall sections on the core from movement relatively along the core, and



seal means engageable between the adjacent ends of adjacent wall sections disposed about and along the core for defining substantially liquid-tight connections between adjacent sections,

whereby, when the wall sections are disposed about the core in serial arrangement along the core and the seal means are engaged between adjacent sections, there results a fluid flow duct of selected overall length in which the weight of the duct is supported by the core.

4,176,864

PIPE STRING CONNECTION FOR HIGH LOAD OPERATION

Louis Pohl, Julius-Voseller-Str. 55 h, 2000 Hamburg 54, Fed. Rep. of Germany, and Heinz Westerhoff, Mühlheim-Ruhr, Fed. Rep. of Germany, assignors to Louis Pohl, Hamburg, Fed. Rep. of Germany

Filed Oct. 25, 1977, Ser. No. 845,312
Claims priority, application Fed. Rep. of Germany, Jul. 12, 1977, 2731434
Int. Cl.[2] F16L *43/00*
U.S. Cl. 285—181 **8 Claims**

1. In an articulated pipe coupling for connecting a stationary pipe connection to a movable pipe connection, the articulated coupling including,

(a) upper and lower articulated pipes,

(b) upper and lower ball pipe joints connecting said upper and lower articulated pipes to the movable and stationary pipe connections, respectively,

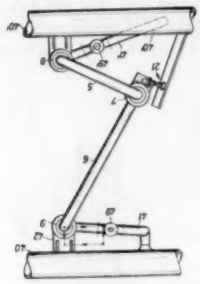
(c) a central ball pipe joint connecting said upper articulated pipe to said lower articulated pipe, said upper, central and lower ball pipe joints each having a spherical sealing ring,

(d) a first guide means connected to said upper and said lower articulated pipes, said central pipe joint located therebetween, for maintaining at said central pipe joint the coaxial alignment between said upper and said lower articulated pipes, and

(e) a second guide means for confining movement of said central joint to a plane perpendicular to its axis,

the improvement comprising:

a resilient tension member, for exerting a force on said upper pipe joint to relieve the loading thereon from the weight of the pipe coupling, said tension member interconnected at an upper end with said upper pipe joint



above the upper pipe joint sealing ring and at a lower end with said upper articulated pipe, such that said tension member produces a force on said upper joint in a direction opposing the force exerted on said upper joint by the weight of the pipe coupling.

4,176,865

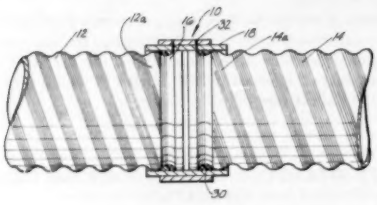
COUPLING FOR PIPE

Dale D. Felton, Anchorage, Ak., and William R. Jones, Springboro, Ohio, assignors to Armco Steel Corporation, Middletown, Ohio

Filed Mar. 21, 1978, Ser. No. 888,537

Int. Cl.[2] F16L *21/06*

U.S. Cl. 285—373 **29 Claims**



1. A structure comprising, in combination, at least two substantially axially aligned, abutting pipe sections and cooperating coupling means encircling the adjacent ends of said sections to provide a substantially leak tight joint therebetween, each said pipe section being provided at each end thereof with at least one annular, circumferentially continuous, depression, the outside diameter of the exterior surface in which said depression is formed providing continuous surface-to-surface seal with said coupling means about the entire circumference of said pipe section, said coupling means comprising a first band encircling the adjacent ends of said lengths of pipe, said first band having a predominately flat cross section and being of a width to provide said continuous surface seal with the exterior surface in which said depressions are formed, said first band having a pair of free ends adapted to overlap each other, a second band overlying the outer surface of said first band, said second band having a predominately flat cross section, means for tensioning the free ends of said second band together, and a resilient sealing ring positioned in a depression on an abutting end of each of said pipes, said ring being such that it cannot extrude out of its depression and such that it is contiguous with the underside of said first band when the ends of said second band are tensioned together.

4,176,866

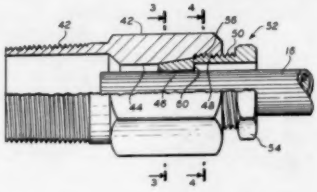
STANDARDIZED GLAND ASSEMBLY FOR CABLE CONNECTIONS

Solomon Rubinstein, Fanwood, N.J., assignor to General Cable Corporation, Greenwich, Conn.

Filed May 17, 1978, Ser. No. 906,743

Int. Cl.[2] F16L *25/00*

U.S. Cl. 285—421 **7 Claims**



1. Apparatus for clamping a metal sheathed cable to a gland body having a longitudinally extending opening therein, and a bore constituting a portion of the length of the said opening and constituting a portion of the opening that is of minimum cross-section and into which electrical cables of different size are inserted for connecting the cables with a box of an electrical wiring system, means on one end of the gland body for connecting it with said box, the bore having a tapered cross-section for at least a part of its length, an annular, metallic, clamping ring having a cylindrical inside diameter smaller than the minimum diameter of the bore and that fits around a cable of an outside diameter that fits into the clamping ring for connection with the gland body, the clamping ring having an outside surface with a taper that contacts with the tapered surface of the bore at an axial location corresponding generally to the tapered surface of the bore whereby pressure between the tapered surfaces of the bore and clamping ring is transmitted directly through the metal of the clamping ring and into contact with an outside surface of the cable sheath of a cable in the ring, a pressure element connected with the gland body and movable in a direction to exert axial pressure on the clamping ring for distorting the metal of the clamping ring axially by cold flow into progressively greater pressure with the circumferential surface of the cable, the ring being annealed to a hardness proportional to the mean radial thickness of the ring to facilitate greater distortion of the ring as a result of greater mean radial spacing of the tapered surface of the gland body from the circumference of the outside surface of the cable, the pressure element having an end face that confronts an end face of the ring at the end of the ring which has the greater diameter of the tapered surface for thrusting the end face of the ring axially to distort the annealed metal of the ring to flow axially into clamping contact with the metal sheath of the cable, said end face of the pressure element having an area that will extend over a clamping ring of smaller inside diameter, greater wall thickness, and annealed to lesser hardness for clamping a smaller ring to hold a smaller diameter of cable clamped in the gland.

4,176,867

LOCKING CAP FOR FUEL TANK WITH REMOTE UNLOCKING CONTROL

Paul Lipschutz, Croissy, France, assignor to Neiman S.A., Courbevoie, France

Filed Oct. 3, 1977, Ser. No. 839,080

Claims priority, application France, Oct. 6, 1976, 76 29999

Int. Cl.[2] E05B *47/00*

U.S. Cl. 292—201 **3 Claims**

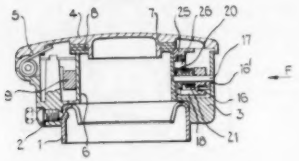
1. A locking cap for a fuel tank comprising,

(a) a body member,

(b) a lid pivotable on the body member,

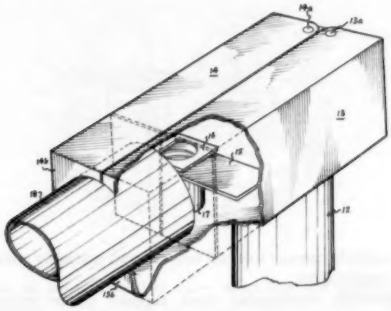
(c) a pivotable locking device on said body member,

(d) means mounted on the lid engageable by said locking device for holding the lid in a locked position,
(e) a locking slider capable of holding said locking device in a locked position of said lid,
(f) a U-shaped electromagnet on said body member and



(g) two armatures mounted on said body member for pivoting at an intermediate point of their length and respectively articulated at their extremities remote from the electromagnet to said locking slider.

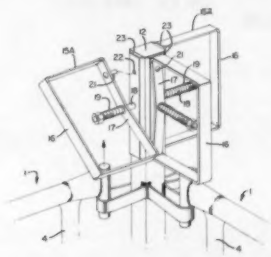
4,176,868
SECURITY GATE POST
George A. Cole, 4529 Royal Oak Dr. SW., Roanoke, Va. 24015
Filed May 11, 1978, Ser. No. 905,288
Int. Cl.[2] E05C *3/04*
U.S. Cl. 292—258 **4 Claims**



1. A security device for detachably fastening the free end of a cantilever member rigidly to an upright post comprising a pedestal attached to the top of said post, a pair of U-shaped arms pivotally mounted at their ends on said pedestal, the open sides of said arms facing each other in clam-shell fashion, a closure in the free end of each said arm, and an opening in each said closure, said openings together encompassing the end of said member to connect it to said post when said arms are closed together.

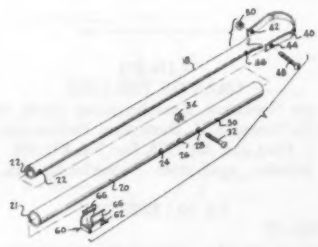
4,176,869
GATE LATCHING APPARATUS FOR ANIMAL CLOSURE PANELS
Carl V. Gilst, Goshen, Ind., assignor to Ag Best Corporation, Goshen, Ind.
Filed Jan. 26, 1977, Ser. No. 762,516
Int. Cl.[2] E05C *13/02*
U.S. Cl. 292—304 **25 Claims**

1. Apparatus for detachably hingedly connecting an end of an animal closure panel member with relatively fixed support structure; said apparatus comprising:
a panel member,
panel member detent means attached to the panel member,
relatively fixed support structure,
support structure detent means attached to said relatively fixed support structure,
said panel member detent means and said support structure detent means being lockingly engageable when said panel member and said support structure are in a predetermined connected position with one another with said panel member hingedly carried by said support structure for hinged movement about a vertical hinged axis,
and a locking member which is attachable to one of said panel member and said support structure and which is manually movable between a locking position in engagement with the other of said panel member and said support structure to lock said panel member and such support



structure in said connected position and an unlocking position permitting free manual movement of said panel member out of said connected position and away from said support stucture in a manner that an end of the panel member can be selectively manually hingedly connected to support structure and disconnected therefrom independently of any tools and with only parts continuously carried by said panel member and said support structure,
wherein said panel member detent means and said support structure detent means are configured so that said panel member is hingedly vertically supported by said support structure independently of the position of said locking member.

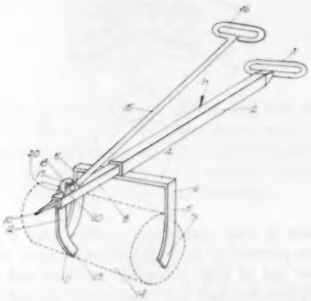
4,176,870
SAFETY DOOR HOLDER
Julian L. Cracraft, 255 Lexington Dr., Daytona Beach, Fla. 32014
Filed Feb. 2, 1978, Ser. No. 874,910
Int. Cl.[2] E05C *17/30*
U.S. Cl. 292—338 **9 Claims**



1. A security device for doors of the type having a doorknob having a shaft portion, said security device comprising an elongated rigid rod having an upper end and a lower end and being of a length greater than the distance from the doorknob to the floor of the room, attachment means including a relatively flexible band member loosely encircling the doorknob shaft portion so as to be easily swingable about the axis of the doorknob shaft and connected on opposite ends to the upper end of the elongated rigid rod for supportingly attaching the

upper end of said elongated rigid rod to said doorknob so that the rigid rod is easily swingable about the axis of the doorknob shaft with the lower end of said elongated rigid rod also being positionable to engage the floor in front of the door at a spaced distance from the door to prevent opening movement of the door by applying a jamming reactive force thereagainst in response to any attempted opening movement of the door.

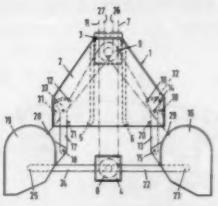
4,176,871
FIREPLACE TONGS
Donald E. Stover, R.R. 1, Box 151, Carey, Ohio 43316
Filed Sep. 14, 1978, Ser. No. 942,381
Int. Cl.[2] A47J *49/14*
U.S. Cl. 294—10 **5 Claims**



1. A fireplace tool comprising a tubular stationary member having grasping means located at one end and one or more downwardly depending claw-like tines attached to the opposite end, a telescoping member having one end slidably received within said stationary member and the opposite end terminating in one or more downwardly depending claw-like tines, and an elongate lift member pivotally attached at one end to the upper side of said telescoping member adjacent said tine bearing end and terminating at its opposite end in grasping means, said telescoping member being shiftable between an open position wherein said one or more tines depending from said stationary member are spaced from said one or more tines depending from said telescoping member for accepting a log therebetween and a closed position wherein said one or more tines depending from said stationary member and said one or more tines depending from said telescoping member may be brought into abutting contact with the outer surfaces of the log.

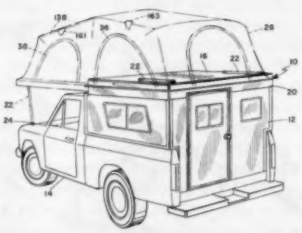
4,176,872
GRAB OR THE LIKE
Leendert van Huuksloot, Zevenbergschen Hoek, Netherlands, assignor to Nemag, B.V., Rotterdam, Netherlands
Filed Jan. 23, 1978, Ser. No. 871,598
Claims priority, application Netherlands, Jan. 27, 1977, 7700847
Int. Cl.[2] E02F *3/44*
U.S. Cl. 294—70 **3 Claims**

1. A grab or the like, substantially comprising a frame or upper structure having a pivoting lever for each grab bucket, at one end of which lever is positioned the pivot point of a grab bucket, each grab bucket being adapted to be brought by means of a rope to the opened position and via a lever system coupled to a pulley block movable in the frame, into the closing position, characterized in that each grab bucket is connected by a lever to a movable pulley block so that in the opened position of the grab buckets the levers are adapted to form an angle of 180°, while the grab buckets, in an intermediate upper position of the movable pulley block, sealingly abut against each other with the lower and side boundary edges and



in the uppermost position of the movable pulley block sealingly abut against each other with the lower boundary edges.

4,176,873
CAMPER TOP TENT ASSEMBLY
Dwight L. Barr; Leslie A. Barr; Benson P. Swett, all of San Diego, and Charles M. Ray, La Mesa, all of Calif., assignors to Barr Industries, Inc., Santee, Calif.
Filed Oct. 31, 1977, Ser. No. 846,887
Int. Cl.[2] B60P *3/34*
U.S. Cl. 296—156 **29 Claims**



1. A vehicle camper top and bed support assembly comprising in combination:

a generally rectangular open support frame extending around the top edge of the walls of a vehicle for defining an opening for supporting the top of the vehicle,

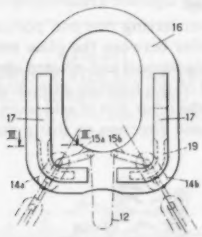
a generally flat rectangular top having inside and outside faces and pivotally connected at one end to said frame about an axis that is transverse to the longitudinal axis of the vehicle on which said frame is mounted and pivotal between closed position for closing said opening, and an open position for defining a bed support for supporting a sleeping pad, and

a sleeping pad secured by means of an adhesive directly to said inside face of said top and thereby movable therewith to said closed position and to said opened position so that said sleeping pad is retained and supported on said inside face when said top is in the closed position.

4,176,874
LIFTING RINGS FOR CHAIN SLINGS
Jean F. Archer, Villennes, France, assignor to Stas Societe Technique d'Accessoires Specialises, Sartrouville, France
Filed Jul. 6, 1978, Ser. No. 922,509
Claims priority, application France, Jul. 7, 1977, 77 21841
Int. Cl.[2] B66C *1/12*
U.S. Cl. 294—78 A **1 Claim**

1. A lifting ring for a chain sling, said ring comprising a body having side portions and a bottom portion, two lugs rigid with the body, each lug having means defining an elongate opening

whose width is greater than the thickness of the chain links, but smaller than their width and terminating at the top in an opening of greater width than that of the said links, said lugs being perpendicular to the plane of the body and being bent in such



a manner as to extend partly over the side portions of the body and partly over the bottom portion of the body, the bottom portion of the said lugs being directed towards the central plane of the ring.

4,176,875

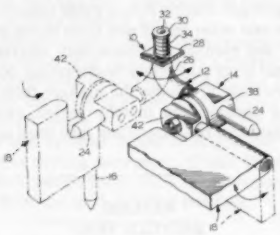
NOVEL WINDSHIELD VISOR SUPPORT AND ADAPTER

Walter K. Dow, 86 Converse St., Longmeadow, Mass. 01106

Filed Jun. 27, 1978, Ser. No. 919,499

Int. Cl.[2] B60J *3/02*

U.S. Cl. 296—97 K **15 Claims**



1. In an automobile sun visor assembly, the combination comprising:

a. a mounting bracket adapted to be mounted upon a vehicle chassis adjacent the windshield;

b. a shaft member rotatably seated in said mounting bracket and extending therethrough, said shaft member being rotatable within said mounting bracket about a first axis of rotation;

c. pivot means on said shaft member outwardly of said mounting bracket and having a first pivot element mounted on said shaft member, a shaft seated therein, a second pivot element carried by said shaft and pivotable with respect to said first pivot element about a second axis substantially perpendicular to said first axis, said pivot elements having opposed faces extending substantially perpendicularly to said second axis of rotation, a washer disposed on said pivot means shaft between said opposed faces of said pivot elements, means preventing rotation of said washer relative to one of said pivot elements, and means for adjusting the pressure on the opposing faces of said pivot elements and said washer; and

d. a visor support rod carried by said second element, whereby the associated visor carried by said visor support rod may be pivoted about said support rod, and said shaft member may be pivoted about said first axis and said support rod may be pivoted about said second axis to effect movement of the visor about a multiplicity of axes for disposition at various locations and elevations relative to the mounting position of said bracket on the vehicle chassis.

4,176,876

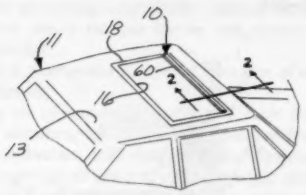
WIND DEFLECTOR

Norman L. Sorensen, Detroit, Mich., assignor to Wisco Corporation, Ferndale, Mich.

Continuation-in-part of Ser. No. 820,105, Jul. 29, 1977. This application Sep. 8, 1977, Ser. No. 831,643

Int. Cl.[2] B60T *7/22*

U.S. Cl. 296—137 J **5 Claims**



1. A wind deflector for a vehicle of the type having a roof with a central opening formed therein and a frame formed around the perimeter of the opening including a rigid section attached to and supported by the roof at the perimeter of the opening and extending into the opening, said wind deflector comprising:

an elongated member adapted to be manually positioned on said frame to extend upwardly from said frame above said vehicle roof and across said opening adjacent the forward edge of said opening; and

means carried by said member for the releasable attachment of said member to said rigid section for manually attaching and removing said wind deflector to said frame.

4,176,877

WATER DRAINAGE SPOUT, ESPECIALLY FOR HOLLOW SPACES IN MOTOR VEHICLE STRUCTURES

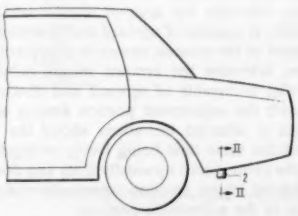
Manfred Schulz, Wildberg, and Gudrun Kappler, Oberreichenbach, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Nov. 1, 1977, Ser. No. 847,494

Claims priority, application Fed. Rep. of Germany, Nov. 5, 1976, 2650679

Int. Cl.[2] B62D *25/00*

U.S. Cl. 296—208 **11 Claims**



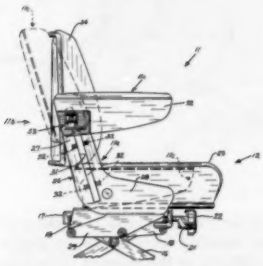
1. In a water discharge nozzle for hollow spaces of vehicle structures of the type having a means for preventing penetration of water from the exterior of the nozzle through a discharge opening of the nozzle which includes a unitary structure forming said nozzle and an apron means surrounding the nozzle and extending therebelow, the improvement wherein said unitary structure comprises a generally frusto-conical shaped depression having a peripheral wall and a closed circular vertex, a hollow cylindrically-shaped extension surrounding said depression and forming said apron, and discharge

opening means formed in said depression above said vertex in a portion of the peripheral wall facing said extension and adjacent said vertex, and wherein said vertex is constructed so as to separate from said peripheral wall by pushing thereagainst.

4,176,878
ARMREST STRUCTURE

L. John Koutsky, Milan, Ill., assignor to Sears Manufacturing Company, Davenport, Iowa

Filed Apr. 24, 1978, Ser. No. 899,193
Int. Cl.[2] A47C *13/00*
U.S. Cl. 297—115 **11 Claims**



1. Armrest structure for a vehicle seat having a seat portion and a backrest portion, comprising:

upwardly elongated guide means disposed closely adjacent to the backrest portion;

an adjustment portion carried by the guide means for selective movement of said adjustment portion upwardly and downwardly along the guide means, said adjustment portion including means providing a transverse pivot means;

means for selectively securing the adjustment portion to the guide means at varying elevations relative to the seat portion;

fore-and-aft armrest means having front and rear end portions and having its rear end portion mounted on said pivot means for arcuate swinging thereof relative to the adjustment portion to extend selectively either forwardly from the pivot means or upwardly from the pivot means generally in the transverse plane of the backrest portion and also for bodily movement of said armrest means in unison with the adjustment means as the latter is moved upwardly and downwardly along the guide means;

and stop means cooperative between the armrest means and the adjustment means for limiting downward swinging movement of the armrest means to a forwardly extending position, whereby the armrest means, while extending forwardly, is capable of upward and downward swinging movement of the armrest means to a forwardly extending position, whereby the armrest means, while extending forwardly, is capable of upward and downward movement with the adjustment portion among several travel positions at selected elevations above the seat portion while at the same time being freely swingable arcuately about the pivot means upwardly from and downwardly to the selected travel position irrespective of the selected position of the adjustment portion.

4,176,879
WHEELCHAIR FOOT REST LATCH

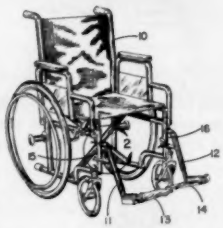
Keith S. Rodaway, Santa Monica, Calif., assignor to Everest & Jennings, Inc., Los Angeles, Calif.

Filed Jul. 31, 1978, Ser. No. 929,332
Int. Cl.[2] A47C *7/50*
U.S. Cl. 297—429 **3 Claims**

1. In a wheelchair foot rest latch in which a downwardly biased plunger in a guide support on the frame portion of a wheelchair is normally received in a plunger receiving opening on a swingable foot rest supporting tube to lock the same in a given position,

(a) a plate member secured to the upper end of said plunger to overlie the upper exit end of said guide support and extending laterally from the vertical axis of movement of said plunger; and

(b) a lever member having one end portion passing under said plate member between the plate member and upper end of said guide support and pivoted about an horizontal axis to the end of the laterally extending portion of said plate member, the other end of said lever member extending in an opposite direction so that a mid-portion of the

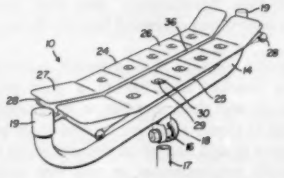


lever between its said one end portion and other end is positioned to be engaged by the upper end of said guide support, said upper end of said guide support serving as a fulcrum for said lever member so that downward movement of said other end of the lever raises said plate member and plunger relative to said guide support, and upward lifting on said other end of said lever raises the lever, plate member and plunger simultaneously whereby said other end of said lever may either be depressed downwardly or lifted upwardly to release the plunger from said plunger receiving opening and thereby permit swinging movement of said foot rest supporting tube to an out-of-the-way position.

4,176,880
BICYCLE SEAT

John L. Marchello, 57751 Grand River, New Hudson, Mich. 48165

Filed Jul. 28, 1978, Ser. No. 929,192
Int. Cl.[2] A47C *7/02*
U.S. Cl. 297—452 **6 Claims**



1. In a bicycle seat having an elongated, U-shaped seat frame having a pair of generally parallel upwardly extending legs interconnected by an elongated base portion having a longitudinal axis, and an elongated, relatively narrow, flexible seating strip formed of a relatively stretch-resistant material, extending between said legs above said seat frame base to define the seat supporting surface extending generally perpendicular to the bicycle longitudinal axis to cradle a rider's adjacent body portion wherein the improvement comprises: a pad, having a center section having a plurality of depressed areas and an end section on each side of the center section wherein the top material of said pad has a frictionally roughened surface and said bottom material is relatively smooth and covers the entire

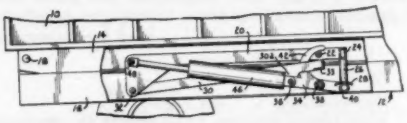
bottom of said pad; a thin sleeve holding said flexible strip between said smooth bottom material and said thin sleeve wherein said thin sleeve covers the bottom of said center section of said pad such that said pad and said thin sleeve form an elongated envelope transversely open near its opposite ends with said flexible strip extending through said envelope.

4,176,881

LOCK DEVICE FOR DUMP TRUCKS

H. Ray Cole, R.R. 1, Rosendale, Mo. 64483

Filed Apr. 27, 1978, Ser. No. 900,414
Int. Cl.[2] B60P *1/16*
U.S. Cl. 298—22 J **9 Claims**



1. A lock device for a dump body mounted to pivot on a frame between a load carrying position and a dumping position, said device comprising:

a hoist mechanism coupled between said body and frame and including extensible power cylinder means for pivoting the body between the load carrying position and the dumping position;

a first lock component coupled with said body;

a second lock component coupled with said frame and engageable with said first lock component to lock said body in the load carrying position; and

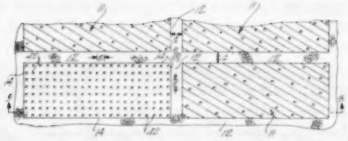
a mechanical linkage comprising lost motion means coupling said cylinder means with said frame in a manner to effect automatic engagement of said first and second lock components when the body is in the load carrying position, said lost motion means being arranged such that initial extension of said cylinder means from the load carrying position effects driving movement of said linkage to release said lock components prior to movement of said body away from the load carrying position.

4,176,882

IN SITU OIL SHALE RETORTS WITH GAS BARRIERS FOR MAXIMIZING PRODUCT RECOVERY

Irving G. Studebaker, and Ned M. Hutchins, both of Grand Junction, Colo., assignors to Occidental Oil Shale, Inc., Grand Junction, Colo.

Filed Feb. 16, 1978, Ser. No. 878,387
Int. Cl.[2] E21C *41/10*
U.S. Cl. 299—2 **61 Claims**



1. A method of recovering liquid and gaseous products from a plurality of in situ oil shale retorts in a subterranean formation containing oil shale, wherein each retort contains a fragmented permeable mass of formation particles containing oil shale, the method comprising the steps of:

excavating at least one void in each of a plurality of in situ oil shale retort sites, leaving a remaining portion of unfragmented formation within each retort site adjacent such a void;

explosively expanding such a remaining portion of unfragmented formation within each retort site toward such a void for forming a fragmented permeable mass of formation particles containing oil shale in each of a plurality of in situ oil shale retorts;

leaving a gas barrier between the fragmented masses in an adjacent pair of such retorts in the form of a vertically extending partition of substantially unfragmented formation sufficiently thick to inhibit substantial gas flow between the fragmented masses in such adjacent retorts and sufficiently thin that the partition independently supports substantially the same proportionate amount of the load from overburden above the elevation of the retorts as is supported by the fragmented masses in such adjacent retorts for permitting substantially uniform subsidence of overburden above the gas barrier and above the fragmented masses;

establishing a combustion zone in at least one of such fragmented masses;

introducing an oxygen-supplying gas to such fragmented mass for sustaining the combustion zone and for advancing the combustion zone through such fragmented mass, and for retorting oil shale to produce liquid and gaseous products in a retorting zone on the advancing side of the combustion zone; and

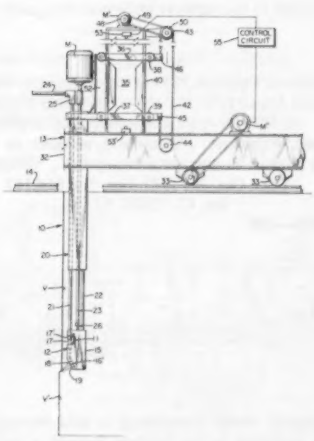
withdrawing such liquid and gaseous products from such a fragmented mass on the advancing side of the retorting zone.

4,176,883

OSCILLATING LIQUID JET SYSTEM AND METHOD FOR CUTTING GRANITE AND THE LIKE

Daniel J. Liesveld, 6016 Newcombe St., Arvada, Colo. 80004

Filed May 26, 1977, Ser. No. 800,611
Int. Cl.[2] E21C *25/60, 41/12*
U.S. Cl. 299—17 **26 Claims**



1. The method of cutting hard rock material comprising the steps of:

(a) directing at least one high intensity jet against the surface of the material to be cut;

(b) advancing each said jet along a perdetermined path of travel coinciding with the line to be cut along the surface of the material; and

(c) oscillating the jet along the surface to be cut in a direction transversely of the direction of advancement of said jet along the line to be cut and transversely to the direction of impingement of said jet, said oscillation of the jet being at a rate of speed greater than the rate of speed of travel of said jet along the line to be cut.

4,176,884
ANCHORING APPARATUS FOR A MINING INSTALLATION

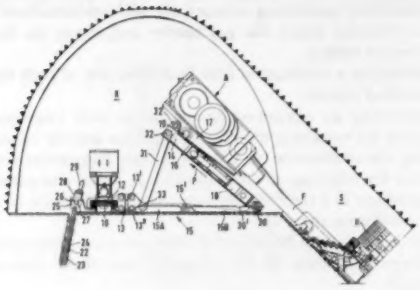
Helmut Erwien, Luner, and Werner Karsten, Gelsenkirchen, both of Fed. Rep. of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Fed. Rep. of Germany

Filed Jan. 30, 1978, Ser. No. 873,223

Claims priority, application Fed. Rep. of Germany, Feb. 3, 1977, 2704495

Int. Cl.[2] E21C *29/08*

U.S. Cl. 299—34 **15 Claims**



1. Apparatus for anchoring a mining installation to the floor of a mining working, the apparatus comprising an anchor beam, means for anchoring the anchor beam to the floor, a trolley mounted on the anchor beam for longitudinal movement relative thereto, a guide skid pivotally connected to the trolley, a support skid pivotally connected to the guide skid, a support table for supporting the mining installation, the support table being pivotally connected to the support skid for pivotal movement in a vertical plane, and a support strut pivotally connected to the support table and the guide skid.

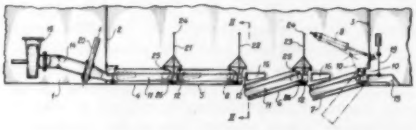
4,176,885
HOPPER VESSEL WITH DISCHARGE VALVE MEMBERS ADAPTED TO SELECTIVELY FUNCTION AS PART OF A DISCHARGE CONDUIT

Jan Alkema, Pijnacker, Netherlands, assignor to Koninklijke Adriaan Volker Baggermaatschappij B.V., Netherlands

Filed Oct. 20, 1977, Ser. No. 844,143

Int. Cl.[2] B65G *53/30*

U.S. Cl. 406—128 **9 Claims**



1. A hopper vessel comprising: a hold having a series of discharge openings in the bottom thereof, a series of valve members mounted for rotation to open and close said discharge openings, said valve members extending horizontally in their closed positions, and a suction conduit having a suction pump at one end and an inlet at the other end, said conduit comprising in part aligned channels through said valve members, characterized in that each valve member is mounted for rotation about a horizontal pivot axis extending transversely of the longitudinal axis of said vessel, said valve members and said conduit in part formed thereby are aligned generally parallel to the longitudinal axis of said vessel, said hold further comprises water supply openings and said valve members are arranged to close said supply openings in the closed position of said valve members, each said valve member is rotatable to an intermediate position thereof inclined to the horizontal in which said discharge opening thereat is closed, said water supply openings thereat are open, said channel therein is disconnected from said conduit and said conduit thereadjacent, in the direction toward said pump, is open to the portion of said hold at said valve member rotated to said intermediate position whereby cargo in said hold may be discharged through said conduit.

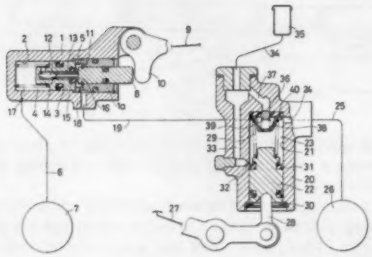
4,176,886
BRAKE APPARATUS FOR MOTORCYCLE

Mamoru Watanabe, Tokyo, Japan, assignor to Watanabe Engineering Co., Ltd., Tokyo, Japan

Filed Aug. 8, 1978, Ser. No. 911,514

Int. Cl.[2] B60T *8/26*

U.S. Cl. 303—6 A **9 Claims**



1. Brake apparatus for a motorcycle, comprising: a piston slidable in a cylinder for a front wheel; a hand-operated lever for actuating said piston, output and input liquid pressure chambers in front and at the back of said piston respectively, at least one auxiliary piston slidable in a cylinder for a rear wheel of said motorcycle, a foot pedal for actuating said auxiliary piston in said cylinder for said rear wheel, at least one output liquid pressure chamber in front of said auxiliary piston, said output liquid pressure chambers of said cylinders for front and rear brakes communicating with front and rear wheel brakes respectively, said output liquid pressure chamber of said cylinder for said rear wheel communicating with said input liquid pressure chamber of said cylinder for said front wheel.

4,176,887
ENDLESS TRACK TRAVELING MECHANISM

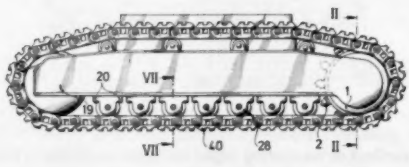
Günther Alpers, and Helmut Bentz, both of Dortmund, Fed. Rep. of Germany, assignors to O&K Orenstein & Koppel Aktiengesellschaft, Berlin, Fed. Rep. of Germany

Filed May 3, 1978, Ser. No. 902,388

Claims priority, application Fed. Rep. of Germany, May 6, 1977, 2720332

Int. Cl.[2] B62D *55/12, 55/20*

U.S. Cl. 305—57 **8 Claims**



1. An endless track travelling mechanism for vehicles provided with a self-propelled drive, particularly hydraulic dredges, comprising

an endless track chain comprising a plurality of chain links, the latter bearing travelling mechanism plates, and bolt means for connecting said chain links with one another,

guide wheel means for guiding said endless track chain,

a drive sprocket wheel having cam-shaped teeth arranged

thereon in a longitudinal center plane thereof, said teeth being formed on sides facing one another with planar surfaces,

said drive sprocket wheel having an outer periphery forming two running rims thereon abutting said chain links, said running rims being arranged on both sides of said teeth,

said drive sprocket wheel being formed with a wheel flange, said cam-shaped teeth being arranged on said wheel flange, the latter on both sides thereof having inclined surface means for guiding said chain links thereon,

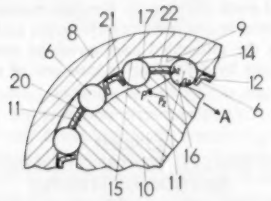
said travelling mechanism plates of said chain links each are formed as double-stud plates and are produced from one piece with a two-sided cam arranged centrally in said chain link, said two-sided cam having engagement surfaces facing said cam-shaped teeth engaging therewith and during engagement constitute contact surfaces for said cam-shaped teeth.

4,176,888

LIMITED SLIDING BALL SPLINE ASSEMBLY

Hiroshi Teramachi, 2-34-8 Higashi-tamagawa Setagaya-ku, Tokyo, Japan

Filed Jul. 27, 1977, Ser. No. 819,285
Claims priority, application Japan, Aug. 18, 1976, 51-097774
Int. Cl.[2] F16C *31/04*; F16D *3/06*
U.S. Cl. 308—6 R **5 Claims**



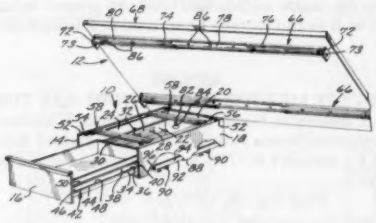
1. A limited sliding ball spline assembly having an outer sleeve member, a shaft member disposed within said sleeve member and a coupling means including ball bearings for coupling said shaft member to said sleeve member for relative rectilinear movement in an axial direction and in relative torque transmitting relationship, the improvement comprising said shaft member and said sleeve member each having formed in their respective complementary inner and outer surfaces thereof a plurality of circumferentially spaced longitudinally extending grooves wherein said sleeve grooves and shaft grooves are sufficiently wide so as to accommodate two spaced apart adjacent rows of ball bearings of said coupling means, said respective sleeve grooves and shaft grooves having the sides thereof formed to complement a circumferential portion of the adjacent ball bearings, said shaft grooves being disposed in out of phased relationship to the sleeve grooves so that a side of a shaft groove and a side of the sleeve groove bear on opposite sides of a ball bearing common thereto, and a retainer disposed between said shaft member and said sleeve member, said retainer having a longitudinally extending rib for retaining the ball bearing in bearing relationship to the respective sides of the sleeve groove and shaft groove adjacent to said ball bearings and said retainer comprising a tubular member having a plurality of elongated slots formed therein, said slots being circumferentially spaced whereby adjacent slots define a pair of rectilinear raceways for containing a row of ball bearings; said rib being defined by said pair of rectilinear raceways having their adjacent edges bent out of the plane of said retainer whereby said row of ball bearings in each raceway is held within their respective raceway by said bent edge and the other edge of said respective raceways.

4,176,889

MODULAR STORAGE UNIT ASSEMBLY

Clifford W. Gartung, Newport Beach, Calif., assignor to Pleion Corporation, Santa Ana, Calif.

Filed Jun. 30, 1978, Ser. No. 920,980
Int. Cl.[2] A47B *47/00, 3/06*
U.S. Cl. 312—195 **20 Claims**



1. A desk assembly capable of subjective positioning of storage units, comprising:

a plurality of modular storage units;

A desk top providing a working surface;

means for maintaining the desk top in an operative position;

second means for selectively positioning relative to the working surface and suspendedly mounting at least one storage unit to the desk top, the second means including at least one support channel mounted to a lower surface of the desk top, and a plurality of mounting rails at least one mounting rail being mounted to a top surface of each storage unit, and

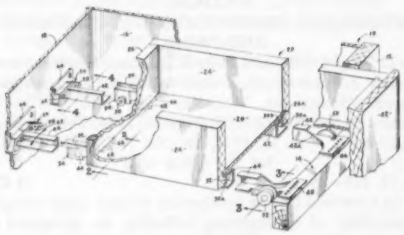
third means for suspendedly mounting a storage unit to a lower surface of another storage unit, the first of such storage units being suspendedly mounted to the desk top by the second means.

4,176,890

DRAWER AND SUPPORT SYSTEM

Howard B. Gorton, San Gabriel, Calif., assignor to Ajax Hardware Corporation, City of Industry, Calif.

Filed Apr. 5, 1978, Ser. No. 893,677
Int. Cl.[2] A47B *88/04*
U.S. Cl. 312—343 **4 Claims**



1. In a drawer and support system, the combination of a drawer having front and rear walls, a pair of sidewalls and a bottom wall, a pair of drawer rails secured along the lower end of the sidewalls respectively, the rails each having inwardly-facing rollers adjacent the rear wall, a drawer housing having a housing front wall formed with an opening to receive the drawer, and a housing rear wall spaced from and parallel to the front, a pair of elongate tracks having a U-shaped cross section, the tracks being disposed spaced and parallel and extending from the lower margin of the opening in the front housing frame to the rear housing wall, ledge means on the rear wall supporting the rear ends of the tracks against downward movement but permitting lateral movement, the tracks having their

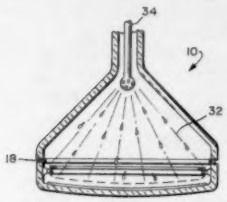
openings facing each other and receiving respectively the rollers, and means confining the tracks to respective locations where they respectively engage the rollers, each sidewall of the drawer being of non-metallic material and the inside surface of each having a groove therealong spaced up from the lower edge, the adjacent edge of the bottom wall extending into the groove, and the associated rail being sheet metal and having a portion which wraps around the bottom of the sidewall up the inside surface and into the groove beneath the bottom wall and to thereby be secured to the sidewall.

4,176,891

SALVAGE METHOD FOR CATHODE RAY TUBES

Ermen S. Antonucci; Duane L. Cadden, both of Waterloo; Albert Regenbrecht, Seneca Falls, and Edward Schwartz, Auburn, all of N.Y., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Sep. 25, 1978, Ser. No. 945,677
Int. Cl.[2] H01J *9/50*
U.S. Cl. 316—2 **5 Claims**



1. In a method of salvaging the glass envelope and enclosed metal shadow mask of a color cathode ray tube, said glass envelope comprising a funnel portion open at its narrow end and a dish-shaped face panel sealed to its wide end by means of a glass frit, said metal shadow mask being suspended within said face panel and wherein said funnel and said face panel are separated by etching the external portion of said frit and subsequently causing a temperative differential between said funnel and said panel whereby said frit fractures from thermal shock, the improvement comprising the step of, prior to said separation, depositing upon at least the upper surface of said mask a chemically basic solution.

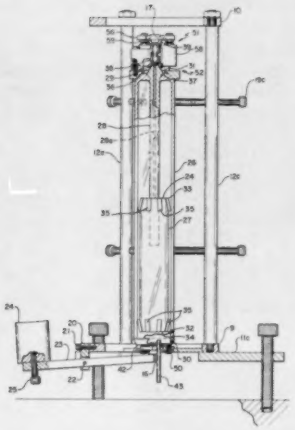
4,176,892

METHOD FOR PRODUCING LASER PLASMA TUBE AND PRODUCT

Dave L. Wright, Palo Alto; Felix J. Schuda, Mountain View, and Joseph J. Spranza, III, Woodside, all of Calif., assignors to Spectra-Physics, Inc., Mountain View, Calif.

Division of Ser. No. 689,039, May 24, 1976. This application Apr. 18, 1977, Ser. No. 788,513
Int. Cl.[2] H01J *9/18*
U.S. Cl. 316—19 **11 Claims**

1. In a method for the production of laser tubes comprising an assembly of components including an elongated glass plasma envelope, a cathode assembly, a capillary structure, optical end elements, metal cathode and anode end assemblies for receiving said optical elements and adapted to be joined to said elongated glass plasma envelope, at least one of said metal cathode and anode end assemblies being deformable for aligning said optical elements to define a laser optical cavity and bonding material interposed between said components for bonding said components to one another to seal the laser tube, the steps of coating the abutting surfaces of said components with said bonding material, placing said cathode assembly in said elongated glass plasma envelope, supporting said metal cathode end assembly, seating one end of said elongated glass plasma envelope on one side of said metal cathode end assembly to be supported thereby, placing one of said optical elements against the other side of said metal cathode end assembly, introducing said capillary structure in said elongated glass plasma envelope to be supported within said envelope by the other end of said envelope, seating the metal anode end assembly on said capillary structure, placing the other optical element on said metal anode end assembly, applying an axial force



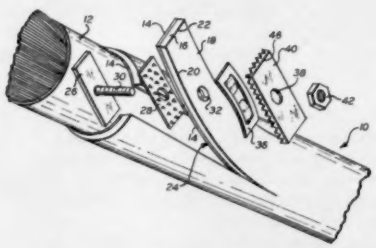
to said assembled components to force them together, heating the assembled parts to cause the bonding material to bond the adjacent surfaces to one another to form the sealed laser envelope, cooling the assembled laser envelope and aligning the optical elements by deforming at least one of said metal end elements.

4,176,893

RELIABLE SHEATH BONDING CONNECTOR AND METHOD OF MAKING

Jerzy A. Olszewski, Edison, and Towheed Ramy, Jersey City, both of N.J., assignors to General Cable Corporation, Greenwich, Conn.

Filed Oct. 25, 1977, Ser. No. 845,039
Int. Cl.[2] H01R *3/06*
U.S. Cl. 339—14 R **19 Claims**



1. A sheath bonding connector for grounding a communication cable that has a core surrounded by a metal shield that is covered on the outside by a plastic jacket, said connector including in combination an inner shoe located on the outside of the core contacts between the metal shield and the outside surface of the inner shoe in position to touch the inner surface of the metal shield, one of the contacts having a surface of non-corrosive metal, a fastening element extending outward from the shoe and through the metal shield and plastic jacket, the fastening element being electrically connected with the inner shoe, a clamping device on the outside of the plastic jacket and secured to the fastening element, a resilient energy-storing device that is held under tension by the clamping element when the connection is fully assembled and held under

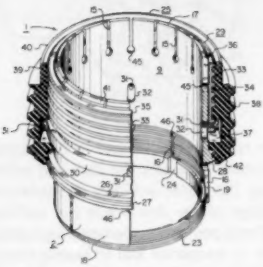
pressure by said fastening element, the resilient energy-storing device maintaining contact pressure in spite of cold flow of structure of the bonding connector.

4,176,894

INTERNAL ELECTRICAL INTERCONNECT COUPLER

Josiah J. Godbey, 812 Nottingham Dr., Richardson, Tex. 75080

Filed Jan. 30, 1978, Ser. No. 873,267
Int. Cl.[2] H01R *3/04*
U.S. Cl. 339—15 **22 Claims**



1. In an electrical conductor assembly of an electrical transmission system for a tubular fluid conductor composed of lengths of pipe and means externally connecting the ends of adjacent lengths of pipe, an inner electrical conductor for the electrical conductor assembly comprising an electrically conductive tube generally coextensive with and mounted within each pipe length in spaced electrically insulated relationship;

means for electrically connecting and insulating the ends of adjacent electrical conductor tubes from the contiguous ends of adjacent pipe lengths including

a generally continuous cylindrical tubular body of electrically conductive material having an external diameter generally equal to the internal diameter of the bores of said tubes for mounting in the end portions of said adjacent tubes so as to extend therebetween and provide electrical contact therewith upon coupling of said external connecting means,

an annular element of elastic dielectric material of less axial length than the tubular body and mounted on the exterior thereof in spaced relation to the ends of said body for engagement with said end portions of said adjacent tubes and deformation into fluid-tight sealing engagement therewith and the contiguous internal surfaces of said adjacent pipe lengths so as to electrically insulate said tube ends from said pipe ends,

means for maintaining the annular elastic dielectric element in its deformed sealing position and said tubular body against displacement upon uncoupling of said external connecting means,

at least one end portion of said body being discontinuous so as to provide discrete resilient members extending longitudinally inward from the outer extremity of said one end portion of said body for flexing radially relative thereto,

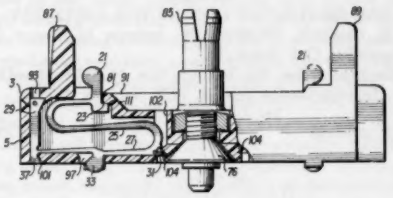
the means for maintaining said elastic dielectric element in its deformed sealing position comprising an annular member within said one end body portion and having wedging engagement with its interior for distending the resilient members to deform said elastic element into said sealing position.

4,176,895

HIGH DENSITY DOUBLE CONTACTING CONNECTOR ASSEMBLY FOR LEADLESS INTEGRATED CIRCUIT PACKAGES

Lionel D. Aldridge, Seminole, Fla., assignor to Burroughs Corporation, Detroit, Mich.

Filed Sep. 27, 1978, Ser. No. 946,280
Int. Cl.[2] H05K *1/12*
U.S. Cl. 339—17 CF **18 Claims**



1. A connector assembly for leadless integrated circuit packages comprising:

(a) a plurality of unitary metallic contacts, each of said contacts comprising:

(i) an elongated S-shaped spring-beam portion;

(ii) a first contacting portion formed on an upper part of said spring-beam portion;

(iii) a preloading tab formed on said upper part of said spring-beam adjacent said first contacting area;

(iv) a substantially flat base portion connected to a lower part of said spring-beam portion; and

(v) a second contacting portion formed on a lower part of said base portion; and

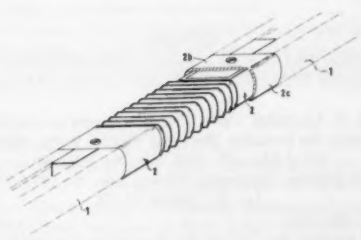
(b) upper and lower dielectric headers each having a plurality of contact receiving cavities formed therein, said cavities separated by a plurality of intermeshing walls, each said cavity of said lower header including channel means for receiving said contact, and each said cavity of said upper header including contact receiving means and preloading means to bias said contact in a preloaded position when said upper header is fitted over said lower header.

4,176,896

CONNECTION FOR ELECTRIC LIGHT RAILS

Karl Wehling, Lemgo, Fed. Rep. of Germany, assignor to Staff KG, Lemgo, Fed. Rep. of Germany

Filed Apr. 17, 1978, Ser. No. 897,068
Claims priority, application Fed. Rep. of Germany, Apr. 20, 1977, 7712356[U]
Int. Cl.[2] H01R *11/32, 35/00*
U.S. Cl. 339—29 R **13 Claims**



1. Connection for electrical light rails which have an internal adapter-receiving channel and electrical conducting strips, the ends of the connection being provided with couplings which plug onto the ends of the light rails and between which are flexible electrical connecting wires enclosed within a mantel

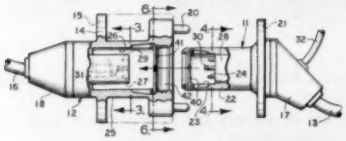
which extends into the couplings, characterised in that the ends of the cable mantle within the couplings are provided with collars which are held behind abutments in the couplings, and that the cable mantle is provided with fins the outer contour of which corresponds to the outer contour of the couplings and/or that of the light rails, and which, when the cable mantle is straight, are parallel to each other and perpendicular to the longitudinal axis of the cable mantle.

4,176,897

EMI PROTECTED CONNECTOR ASSEMBLY

John K. Cameron, Wheaton, Ill., assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Continuation of Ser. No. 743,302, Nov. 19, 1976, abandoned.
This application Feb. 21, 1978, Ser. No. 879,339
Int. Cl.[2] H01R *13/44*
U.S. Cl. 339—40 **31 Claims**



28. A connector assembly comprising, in combination:

a receptacle member including housing means having an open-ended first forward mating portion;

first contact means disposed within said housing means;

a plug member including housing means having a second forward mating portion for telescoping insertion within the open end of said first mating portion to effect electrical contact and electromagnetic shielding therebetween;

second contact means disposed within said second forward mating portion for electrical engagement with said first contact means upon insertion of said plug member into said receptacle member;

closure means disposed at the forward end of said first forward mating portion for enclosing and electrically shielding said first contact means therewithin, said closure means opening upon insertion of said second forward mating portion into and electrical contact with said first forward mating portion to enable said second contact means to engage said first contact means; and

electrically-conductive sealing means disposed between said closure means and said open-ended first forward mating portion for providing environmental and electromagnetic shielding of said first contact means when said closure means is in a closed position, said housing means, said closure means and said electrically-conductive sealing means cooperating to provide complete electromagnetic shielding of said first contact means before, during and after engagement of said plug and receptacle members.

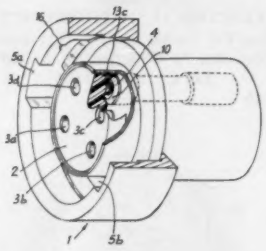
4,176,898

ELECTRIC PLUG AND SOCKET CONNECTORS WITH RESILIENT END-PRESSURE CONTACTS AND SAFETY DISC

Gilles A. G. Marechal, Paris, France, assignor to Societe d'Exploitation des Procedes Marechal SEPM, Paris, France

Filed Mar. 27, 1978, Ser. No. 890,164
Claims priority, application France, Apr. 15, 1977, 77 11433
Int. Cl.[2] H01R *13/44*
U.S. Cl. 339—41 **6 Claims**

1. An electric plug and socket connector comprising: a base; a rotary safety disc mounted on the base, said disc defining a plurality of contact positions and a plurality of recesses; a plurality of movable contacts resiliently urged towards a respective one of the contact positions; projecting insulating elements connected to the movable contacts; and a plug provided with fixed pins, wherein said rotary safety disc masks the movable contacts when in its resting position, and is provided with as many openings as there are pins on the plug, sized and arranged suitably to enable said pins to pass through said openings and to become applied end-wise on the movable contacts after rotation of the disc, wherein said plug and socket is adapted so that the angular locking or detention in the resting position and in the contact position of the safety disc is ensured, at least in part, by the same projecting insulating elements, and urged by the resilient means of the latter to be



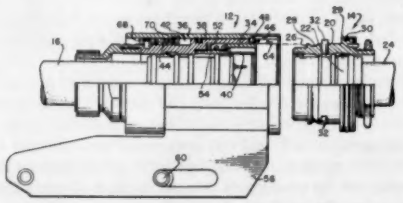
engaged in the resting position and in the contact position in the separate recesses formed in the disc, and wherein the recesses determining the latter position are substantially coaxial with the openings of the disc while the surfaces and shapes respectively of said projecting elements and of the recesses are suitably chosen to cooperate and to enable the obtaining by a rotation of the disc, at the beginning and at the end of the rotation, respectively, withdrawal of said elements and an engagement of the latter in the recesses.

4,176,899

QUICK DISCONNECT ELECTRICAL CONNECTOR HAVING DISASSEMBLY FEATURES FOR REFURBISHMENT

Edward E. Betts, Escondido, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 23, 1978, Ser. No. 953,509
Int. Cl.[2] H01R *13/62*
U.S. Cl. 339—45 M **5 Claims**



4. In the female portion of a quick disconnect of the type having concentric sleeves which are slidable with respect to one another, the forward ends of the sleeves being adapted to receive a male portion of the quick disconnect, the rearward end of one of the sleeves being connected to an elongated element, an annular space provided at the rearward end portions of an inner and outer adjacent pair of the sleeves, and a compression spring within the annular space for urging the adjacent sleeves longitudinally with respect to one another, the improvement comprising:

means located within a rear portion of said annular space and releasably connected to the inner adjacent sleeve for stopping rearward movement of the compression spring; and

means located within a forward portion of the annular space

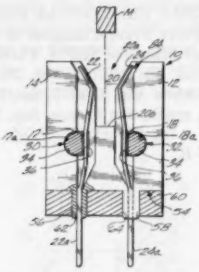
and releasably connected to the outer adjacent sleeve for stopping forward movement of the compression spring whereby, after release and removal of the stop means, the outer sleeve can be slid forwardly and removed entirely from the inner sleeve.

4,176,900

LOW INSERTION FORCE CONNECTOR

Clyde K. Hines, Arcadia; Everett J. Long, Claremont, and Elmer W. Muench, Covina, all of Calif., assignors to Everett/-Charles, Inc., Pomona, Calif.

Filed Dec. 23, 1977, Ser. No. 863,786
Int. Cl.[2] H05K *1/07*
U.S. Cl. 339—75 MP **43 Claims**



33. A contact carrier housing for up to two electrical spring contacts comprising:

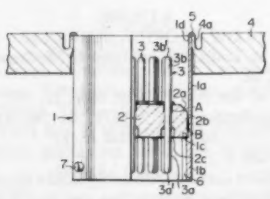
a nonconductive member comprising substantially oppositely facing first and second outer sides and substantially oppositely facing third and fourth outer sides between the first and second sides, a notch in the member having an open end at the third side and a closed end between the third and fourth sides, a pair of spaced cam openings, each having a cam surface, the notch and a pair of cam openings extending through the member between the first and second sides, at least one recess in the first side of the member communicating with the notch for receiving such spring contacts, and first and second spaced spring contact mounting passages extending through the member from the at least one recess to the fourth side of said member each for receipt of such a spring contact.

4,176,901

BAKABLE MULTI-PINS VACUUM FEEDTHROUGH

Hajime Ishimaru, Ibaraki, Japan, assignor to National Laboratory for High Energy Physics, Japan

Filed Jun. 1, 1978, Ser. No. 911,329
Claims priority, application Japan, Jun. 5, 1977, 52/66022
Int. Cl.[2] H01B *17/16, 17/26*
U.S. Cl. 339—136 M **8 Claims**



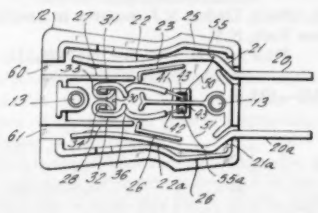
1. In combination with a vacuum vessel having a wall with an aperture therein, a bakable multi-pin vacuum feedthrough comprising a metal cylinder having at one end a thin cylindrical wall portion and at the opposite end a thick cylindrical wall portion with an internal shoulder separating said two cylindrical wall portions, a disc-shaped ceramic pin-holder received in said thin cylindrical wall portion and seating on said shoulder, and a plurality of parallel metal terminal pins extending through said pin-holder and projecting from both faces thereof, said pins having at both ends rounded male portions which are recessed inwardly of the respective ends of said metal cylinder, an end portion of said thin cylindrical wall portion being received in said aperture and circumferentially welded to said wall at a location spaced axially inwardly (toward the evacuated interior of said vessel) from said pin-holder, the portion of said metal cylinder in which said pin-holder is received being free of said wall and said thin wall portion of said metal cylinder serving as a flexible skirt to absorb welding distortion so that it does not affect said pin-holder, first sealing means adjacent the inner (vacuum) face of said pin-holder providing a seal between said pin-holder and each of said pins and second sealing means spaced axially outwardly from the inner face of said pin-holder providing a seal between the periphery of said pin-holder and said thin cylindrical wall portion of said metal cylinder, said second sealing means being displaced axially outwardly from said first sealing means, the axially inner portion of said pin-holder in which said first sealing means is provided being free of said thin cylindrical wall portion of said metal cylinder, and said pin-holder having an annular recess surrounding each of said pins and extending inwardly from the outer (atmosphere) face of said pin-holder.

4,176,902

METHOD FOR FUSING MALE PLUG AT END OF POWER LINE CORD

Elliot Bernstein, Rockville Center, N.Y., assignor to Bel Fuse Inc., Jersey City, N.J.

Filed Oct. 27, 1977, Ser. No. 846,036
Int. Cl.[2] H01H *85/12;* H01R *13/68*
U.S. Cl. 339—147 P **7 Claims**



1. A fused plug comprising a housing;

a pair of prongs mounted in said housing and having substantially parallel extensions outside said housing;

an opening in said housing;

a line cord extending through said opening into said housing;

said line cord comprising a pair of wires;

a fuse link between the end of at least one wire and a prong adjacent said wire;

wherein a pair of sleeves is positioned in the said housing;

an end of one of said wires and an end of one of said fuse links being inserted in each sleeve and connected by pressure fit therein.

4,176,903

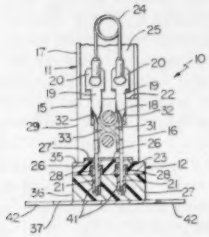
PLUG IN IGNITER UNIT AND METHOD OF MAKING THE SAME

Anthony C. Cairo; Ditmar K. Tillmann, and Gene I. Insley, all of Holland, Mich., assignors to Robertshaw Controls Company, Richmond, Va.

Filed Nov. 21, 1977, Ser. No. 853,284
Int. Cl.[2] F23Q *7/22;* H01R *3/00, 5/02*
U.S. Cl. 339—147 R **7 Claims**

1. In a plug in igniter system for a fuel burning apparatus having at least one electrical receptacle and a plug in igniter

unit provided with a housing means having an electrical igniter therein and terminal means electrically interconnected to said electrical igniter and projecting from said housing means to be received in said receptacle for electrical interconnection thereto, the improvement wherein said terminal means comprises at least one blade-like terminal member having opposed ends respectively being interconnected to said igniter and said receptacle and being twisted between said opposed ends thereof to define a twisted section thereof, said housing means



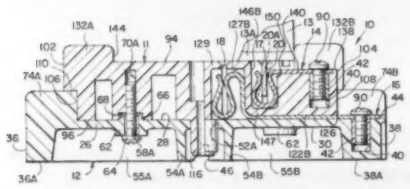
having a body portion provided with a chamber passing therethrough and receiving said twisted section therein whereby said opposed ends of said terminal member extend outwardly from said body portion in opposite directions, and securing means disposed in said chamber to secure said twisted section to said body portion, the end of said terminal member that is received in said receptacle having precious metal on the outer surface thereof that operatively interconnects with said receptacle.

4,176,904

ELECTRICAL TERMINAL

Edward A. Obuch, Linden, N.J., assignor to Amerace Corporation, New York, N.Y.

Filed Sep. 30, 1977, Ser. No. 838,374
Int. Cl.[2] H01R *9/00, 23/00*
U.S. Cl. 339—192 R **22 Claims**



21. An electrical socket for use with electrical devices such as relays, which comprises:

(a) a first section and a second section, said first section being adaptable for being interconnected with said second section, said first section having floor means for receiving therein said second section;

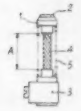
(b) said second section being adapted to be seated on said floor means, said second section having first and second sides and comprising at least one first terminal-receiving cavity disposed in said first side and at least one second terminal-receiving cavity disposed in said second side, and at least one second terminal-receiving cavity being juxtaposed within said second section so as to be electrically insulated and isolated from one another, said at least one first terminal-receiving cavity being adaptable for receiving therein a first corresponding contact member of said electrical device through a first opening in said first side of said second section, and said at least one second terminal-receiving cavity being adaptable for receiving therein a second corresponding contact member of said electrical device through a second opening in said first side of said second section, said first terminal-receiving cavity having disposed therein a corresponding one of first terminal members, said second terminal-receiving cavity having disposed therein a different corresponding one of second terminal members, and wherein an end portion of said first terminal member for connecting to a corresponding external conductor is supported within a recess in an upper portion of said second section, and an end portion of said second terminal member for connecting to a different corresponding external conductor is supported within a recess defined by a lower portion of said second section and by a portion of said floor.

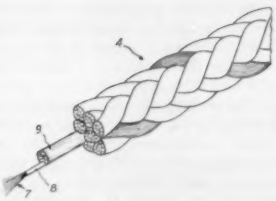
4,176,905

FLEXIBLE ELECTRICAL CONTACT

Gilles Marechal, Paris, France, assignor to Societe d'Exploitation des Procedes Marechal SEPM, Paris, France

Continuation of Ser. No. 791,747, Apr. 28, 1977, abandoned.
This application Aug. 1, 1978, Ser. No. 930,256
Claims priority, application France, Sep. 22, 1976, 76 28500
Int. Cl.[2] H01R *13/16*
U.S. Cl. 339—255 R **4 Claims**





1. An electrical contact having a contact head movable toward and away from a base and connected to the base by an axially collapsible flexible connector and a helical spring surrounding the flexible connector and serving to urge the contact head away from the base, wherein the flexible connector comprises a plaited cable formed by plaiting together a plurality of cords into a solid mass, each of said cords having an outer surface formed by a plurality of strands twisted together in one direction into a solid mass, each of said strands comprising a plurality of filaments twisted together in the other direction.

4,176,906

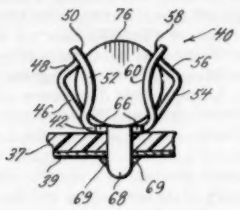
LOW PROFILE FUSE CLIP

Angelo Urani, St. Louis, Mo., assignor to McGraw-Edison Company, Elgin, Ill.

Continuation of Ser. No. 779,319, Mar. 21, 1977, abandoned.
This application Jun. 2, 1978, Ser. No. 911,820
Int. Cl.[2] H01R *13/12*
U.S. Cl. 339—258 F **12 Claims**

1. A fuse holder that can releasably hold a ferrule-like terminal of a cartridge-type electric fuse and that is securable to a circuit board and that comprises a unitary metal stamping which has a substantially-planar base, a first arm that extends upwardly from one side of said base, a second arm that extends upwardly from the opposite side of said base, a securing projection that extends downwardly below the level of the bottom of said base to telescope into an opening in said circuit board, a second securing projection that extends downwardly below the level of said bottom of said base to telescope into a second

opening in said circuit board, said securing projections being spaced apart to coact with said openings in said circuit board to resist shifting of said fuse holder relative to said circuit board, said arms having the upper ends thereof inclined relative to each other to diverge outwardly and upwardly from each other, said uper ends of said arms serving as cam surfaces which can respond to movement of said ferrule-like terminal of said cartridge-type fuse toward said base to cam said upper ends of said arms away from each other and thereby permit said ferrule-like terminal of said cartridge-type fuse to pass between said upper ends of said arms until the bottom of said ferrule-like terminal of said cartridge-type fuse abuts a portion of said base, said arms having the lower ends thereof substantially planar and inclined relative to each other to diverge outwardly and upwardly from each other, said arms having portions that are intermediate said upper ends and said lower ends thereof and that are substantially planar and are inclined relative to each other to converge inwardly and upwardly toward each other, said portion of said base and said bottom of



said ferrule-like terminal of said cartridge-type fuse providing a first line contact between said fuse holder and said ferrule-like terminal of said cartridge-type fuse, one of said arms having a portion thereof which engages said ferrule-like terminal of said cartridge-type fuse to provide a second line contact between said fuse holder and said ferrule-like terminal of said cartridge-type fuse that is displaced at least one hundred degrees from said first line contact between said fuse holder and said ferrule-like terminal of said cartridge-type fuse and the other of said arms having a portion thereof which engages said ferrule-like terminal of said cartridge-type fuse to provide a third line contact between said fuse holder and said ferrule-like terminal of said cartridge-type fuse that is displaced at least one hundred degrees from said first line contact between said fuse holder and said ferrule-like terminal of said cartridge-type fuse, the upper edges of said upper ends of said arms not extending above the level of the top of said ferrule-like terminal of said cartridge-type fuse whenever said bottom of said ferrule-like terminal of said cartridge-type fuse abuts said base, whereby said fuse holder has a low profile.

4,176,907

SCANNING DEVICE

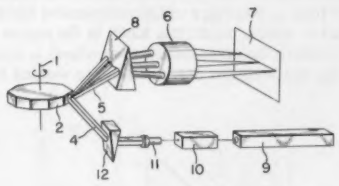
Kazuya Matsumoto, Yokohama; Naoto Kawamura, Inagi, and Setsuo Minami, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 2, 1977, Ser. No. 830,340
Claims priority, application Japan, Sep. 3, 1976, 51-105463
Int. Cl.[2] G02B *27/17*
U.S. Cl. 350—6.8 **10 Claims**

1. A scanning device capable of providing a linear scanning line on a surface to be scanned, comprising:

a deflector having a deflecting mirror surface disposed parallel to the rotation axis thereof;

a light source optical system for causing a stationary collimated beam to impinge upon said deflecting mirror surface from a finite angle with respect to a plane crossing both said rotation axis and said deflecting mirror surface at right angles therewith and toward the rotation axis of the deflecting surface; and



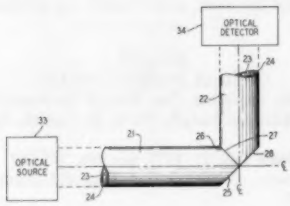
a correcting optical element disposed between said deflecting mirror surface and said surface to be scanned for correcting a curved scanning line to a linear scanning line.

4,176,908

DEVICES FOR MONITORING, SWITCHING, ATTENUATING OR DISTRIBUTING LIGHT

Richard E. Wagner, Fair Haven, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 14, 1977, Ser. No. 860,155
Int. Cl.[2] G02B *5/14*
U.S. Cl. 350—96.15 **20 Claims**



1. A device comprising

a first fiber having a first longitudinal center axis and a first wedge-shaped end portion with two planar sides, each planar side of the first end portion intersecting the first center axis at an acute angle,

a second fiber having a second longitudinal center axis and a second wedge-shaped end portion with two planar sides, each planar side of the second end portion intersecting the second center axis at an acute angle, and

means for holding one planar side of the first end portion against one planar side of the second end portion, so that the first center axis intersects the second center axis.

4,176,909

PROCESSES FOR PREPARING A CONNECTOR END ON A FIBER BUNDLE OPTICAL CABLE AND CABLES THUS OBTAINED

Jean-Claude Prunier, Herblay, France, assignor to Souriau et Cie, Billancourt, France

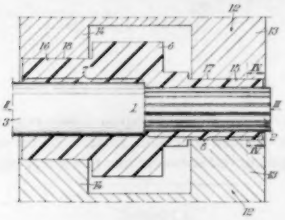
Filed Jan. 16, 1978, Ser. No. 869,497
Claims priority, application France, Jan. 18, 1977, 77 01315
Int. Cl.[2] G02B *5/14*
U.S. Cl. 350—96.20 **18 Claims**

1. Process for fixing a connector tip to one end of an optical cable of a bundle of fibers surrounded by an outer protector sheath constituted by a thermoplastic material, the tip being also constituted by a thermoplastic material weldable under the effect of heat with that of the outer sheath, said process comprising the sequence of the following steps: removing the sheath of the cable in the vicinity of said end,

placing the tip in position on said end so that it surrounds and is in contact with, on the one hand, a zone of the cable stripped of its outer sheath and, on the other hand, a zone

of the cable provided with its outer sheath and adjacent to said strippd zone,

and subjecting the tip to a radial flow of ultrasound at the same time as exerting a radial compressive force on it, by means of which, on the one hand, in the region of the tip surrounding the outer sheath, the surfaces in contact with the tip and with the outer sheath are welded to one another and the outer sheath is grippd around said bundle and on the other hand, in the region of the tip surrounding the zone of the cable stripped of its outer sheath, the softened thermoplastic material of the tip is caused to penetrate between those fibers which are situated at the periphery of the bundle and in the immediate vicinity of the tip and the fibers of the bundle are gripped together.



4,176,910
OPTICAL RIBBON CABLES

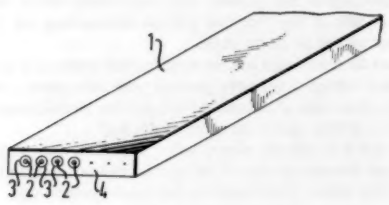
Björn Nöethe, Ebersberg, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Feb. 17, 1977, Ser. No. 769,562

Claims priority, application Fed. Rep. of Germany, Feb. 19, 1976, 2606777

Int. Cl.² G02B 5/16

U.S. Cl. 350—96.23 **9 Claims**



1. An optical flat ribbon cable comprised of a pluralality of optically transmissive glass fiber arranged parallel to one another and each having a layer of a separating and lubricating material thereon, said separating and lubricating material being selected from the group consisting of a silicone oil based on polymethylsiloxans or polymethylphenylsiloxans, a hydrocarbon boiling at relatively high temperatures, ester oils analagous to oils for machines or clocks or to softeners, talc, slate powder, mica powder, graphite powder, metal powder, powdered organic materials such as starch flour and mixtures thereof, said glass fibers each having a layer of said separating and lubricating material thereon being enveloped within an outer cable body comprised of a soft cast synthetic resin which is liquid in state during casting at temperatures between 20° and 100° C., and by chemical reaction is crosslinked into a soft solid state, like elastic rubber, by using components in the soft cast resin having a relatively low concentration of reactive groups, as for example, groups of isocyanate or epoxy and further groups of hydroxyl, amino or carboxyl, said layer of separating and lubricating material floatingly suspending said parallelly arranged glass fibers within said outer enveloping cable body composed of said soft cast synthetic resin.

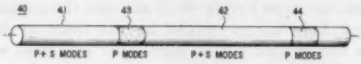
4,176,911
GRADED INDEX OPTICAL FIBER

Enrique A. J. Marcatili, Rumson, and Dietrich Marcuse, Lincroft, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 28, 1976, Ser. No. 681,238

Int. Cl.² G02B 5/14

U.S. Cl. 350—96.31 **8 Claims**



1. A multimode graded-index optical fiber waveguide comprising, in combination, a central core region, a cladding region radially surrounding and forming a boundary with the core region, the core region having a refractive index which continually decreases in a radially outward direction from a maximum value on the fiber axis, the waveguide being normally supportive of optical wave propagation in a first group of guided modes having a field distribution substantially confined within the core region and in a second group of radiating modes having phase constants less than the modes of the first group, the refractive index of the waveguide exhibiting a discrete predetermined decrease in a radially outward direction across the boundary of the core region and the cladding region to effect the generation of a third set of guided modes having a field distribution that extends significantly into the cladding region, the phase constants of the third group of modes being intermediate those of the first group and the second group to effectively isolate the modes in the first group from those in the second group, and means for selectively effecting mode conversion among the so-isolated first modes, said mode conversion effecting means comprising means for introducing periodic perturbations in the axial direction of the waveguide.

4,176,912
MICROSCOPE OBJECTIVE LENS SYSTEM

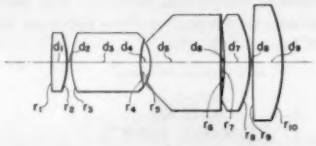
Tsutomu Tojo, Hachiouji, Japan, assignor to Olympus Optical Company Limited, Tokyo, Japan

Filed Mar. 24, 1978, Ser. No. 889,922

Claims priority, application Japan, Apr. 1, 1977, 52-36197

Int. Cl.² G02B 9/60

U.S. Cl. 350—175 ML **7 Claims**



1. A microscope objective lens system comprising a first lens component of a positive lens, a second lens component of a positive meniscus lens having its convex surface faced to the object side, a third lens component of a negative lens, a fourth lens component of a positive meniscus lens having its concave surface faced to the object side, and a fifth lens component of a double-convex lens, and said lens system satisfying the following conditions:

$$0.31f < d_3 < 0.35f \quad (1)$$

$$0.43f < |r_2| < 0.51f$$

$$0.50f < |r_8| < 0.52f \quad (2)$$

$$0.75 < |r_4/r_3| < 0.79 \quad (3)$$

$$4.0d_4 < d_5/n_3 + d_6 + d_7/n_4 < 5.4d_4 \quad (4)$$

-continued

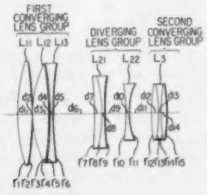
$$\nu_3 = 25.43 \quad (5)$$
$$56 > \nu_1 > 53$$
$$1.73 > n_1 > 1.69$$

wherein the reference symbols r_2, r_3, r_4 and r_8 represent radii of curvature of the surface on the image side of the first lens component, both the surfaces of the second lens component and the surface on the image side of the fourth lens component, respectively d_3, d_5 and d_7 represent thicknesses of the second lens component, the third lens component and the fourth lens component, respectively, d_4 and d_6 represent airspaces between the second lens component and the third lens component and between the third lens component and the fourth lens component, respectively, n_1, n_3 and n_4 represent refractive indices of the first lens component, the third lens component and the fourth lens component, respectively, and ν_1 and ν_3 represent Abbe's numbers of the first lens component and the third lens component, respectively.

4,176,913
TELEPHOTO LENS WITH LARGE RELATIVE APERTURE

Soichi Nakamura, Kamakura, and Kiyoshi Hayashi, Koganei, both of Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed Apr. 27, 1978, Ser. No. 900,794
Claims priority, application Japan, Apr. 28, 1977, 52-48477
Int. Cl.[2] G02B 9/62, 9/64
U.S. Cl. 350—214 **11 Claims**



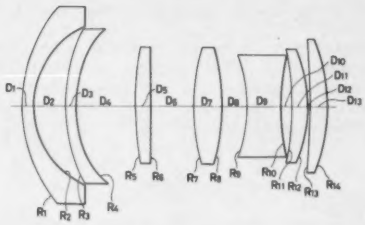
1. A telephoto lens with a large relative aperture comprising a first converging lens group, a diverging lens group and a second converging lens group in this order as viewed from the object side, the first converging lens group comprising two positive lens components and a negative lens component with an air space therebetween, and remaining fixed when focusing, the diverging lens group comprising a cemented negative lens component and a negative lens component with an air space therebetween larger than the sum of the center thicknesses of these components, the second converging lens group comprising a cemented positive lens component, and remaining fixed when focusing, and the first converging lens group and the diverging lens group together forming substantially an afocal system for an object at infinity, and the diverging lens group being movable along the optical axis toward the image side for focusing on an object at a short distance and toward the object side for focusing on an object at a longer distance.

4,176,914
COMPACT RETROFOCUS WIDE ANGLE OBJECTIVE

Kazuo Fujibayashi, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 17, 1978, Ser. No. 906,852
Claims priority, application Japan, May 26, 1977, 52-61467
Int. Cl.[2] G02B 9/64
U.S. Cl. 350—214 **1 Claim**

1. A retrofocus wide angle objective lens comprising seven lenses arranged on a common optical axis and of which the first and second counting from the front are negative meniscus lenses convex toward the front, the third is a positive lens convex toward the front, the fourth is a bi-convex lens, the fifth is a bi-concave lens, and the sixth and the seventh are positive meniscus lenses convex toward the rear, said system being characterized by the following numerical values for the



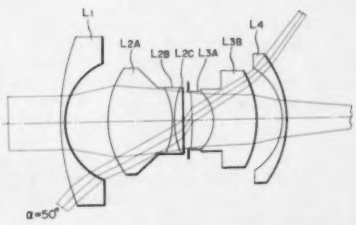
radii of curvature, R, the axial thicknesses or the axial separations, D, the refractive indices, Nd, and the Abbe numbers, || d:

Surface No.	R	D	Nd	νd
1	79.151	5.79	1.60311	60.7
2	44.593	14.21	1	
3	85.091	4.56	1.60311	60.7
4	54.902	27.54	1	
5	184.03	7.09	1.69895	30.1
6	−7813.7	19.86	1	
7	120.79	12.35	1.7725	49.6
8	−107.45	11.33	1	
9	−86.095	15.79	1.80518	25.4
10	113.87	5.09	1	
11	−131.19	7.47	1.713	53.9
12	−65.814	0.7	1	
13	−479.44	8.14	1.7725	49.6
14	−96.351		1	

4,176,915
WIDE ANGLE LENS

Ikuo Mori, Kawasaki, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Oct. 26, 1977, Ser. No. 845,632
Claims priority, application Japan, Nov. 2, 1976, 51/131221
Int. Cl.[2] G02B 9/58
U.S. Cl. 350—220 **6 Claims**



1. A wide angle lens comprising, in the order from the object side;

a divergent first component consisting of a negative meniscus lens element having its convex surface facing the object side,

a compositely convergent second component consisting of three lens elements cemented together and which are in the order from the object side, a biconvex lens element, biconcave lens element and a positive lens element, the center thickness of said biconvex lens element of said

second component being greater than the separation between said first and said second components,

a compositely convergent third component consisting of two lens elements and which are in the order from the object side, a positive lens element and a positive meniscus lens element having its convex surface facing the image side, and

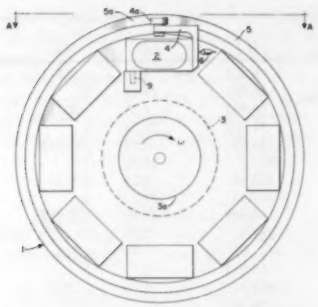
a divergent fourth component consisting of a negative meniscus lens element having its convex surface facing the image side, the separation between said fourth and said third components being less than that between said first and said second components.

4,176,916

CAM FILTER WHEEL

Frank M. Carpenter, Rockford, Ill., assignor to Neotec Corporation, Silver Spring, Md.

Filed Mar. 14, 1977, Ser. No. 777,052
Int. Cl.[2] G02B *5/22*
U.S. Cl. 350—315 **6 Claims**



1. Optical apparatus for continuously varying the bandwidth of light illuminating an object, comprising a source of wide band light for illuminating an object, a filter wheel assembly having a plurality of narrow bandwidth optical interference filters mounted on said wheel assembly, means to rotate said filter wheel about its axis, said interference filters being pivotally mounted on said wheel and positioned relative to the light path defined between said light source and the object such that said filters are swept through said light path individually during rotation of said wheel, means to cause said filters to pivot with respect to said wheel assembly as they are each swept through said light path so as to change their inclination with respect to said light path, whereby the wavelength of the light passing through each of said pivoting filters is varied in accordance with the variation of said inclination of the pivoting filters, said means to cause said filters to pivot comprising a cam track and a cam follower attached to each filter and riding upon said cam track as said filter wheel assembly sweeps each filter through said light path.

4,176,917

LIQUID CRYSTAL DISPLAY DEVICE

Akira Yasutake, Nagaokakyo, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Continuation of Ser. No. 697,429, Jun. 14, 1976, abandoned. This application Jan. 30, 1978, Ser. No. 873,095
Int. Cl.[2] G02F *1/13*
U.S. Cl. 350—336 **5 Claims**

1. A liquid crystal display device comprising:

(a) first and second spaced apart transparent substrates:

(b) a liquid crystal material located between said substrates and being adapted to be activated by an electric field placed between said substrates:

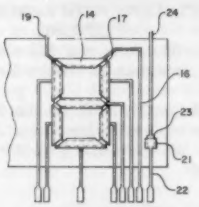
(c) a plurality of unconnected first transparent conductive electrodes formed on the inner surface of said first substrate to provide an overall pattern, each of said first electrodes defining an elongated outer periphery having opposite side edges and being of fixed width from one of said side edges to its opposite side edges;

(d) an equal plurality of first electrical leads formed on said inner surface and respectively connected to said electrodes;

(e) a second conductive electrode formed on the inner surface of said second substrate and being defined by a plurality of connected electrode sections equal in number to said first electrodes, each of said electrode sections defining an elongated outer periphery having opposite side edges and being of fixed width from one of its side edges to its opposite side edge, the width of said sections being less than the width of said first electrodes; and

(f) a second electrical lead formed on said inner surface of said second substrate and connected to said second conductive electrode;

(g) said first electrodes and connected first lead and said second electrode and connected second lead being positioned relative to one another such that



(i) each of said second electrode sections is aligned with a corresponding one of said first electrodes so that its side edges lie entirely within the side edges of said corresponding first electrode, whereby misalignment perpendicular to the side edges of any given first electrode and an aligned second electrode section may occur between said first and second substrates in an amount at most equal to the difference in width between said aligned electrode and electrode section without changing the width of said given electrode and section actually being displayed, and

(ii) said first electrical leads do not have portions which are aligned with said second electrode and said second electrical lead does not have any portion which is aligned with any of said first electrodes whereby, when a voltage is applied between said electrodes, the liquid crystal material therebetween is activated to form a display, said display being adapted to accommodate said misalignment of said first and second substrates before the liquid crystal material opposite any portion of either lead is activated.

4,176,918

FLUORESCENT LIQUID CRYSTAL DISPLAY

Mortimer M. Labes, Philadelphia, Pa., assignor to Temple University, Philadelphia, Pa.

Filed Nov. 14, 1977, Ser. No. 851,393
Int. Cl.[2] C09K *3/34;* C02F *1/13*
U.S. Cl. 350—346 **12 Claims**

1. Liquid crystal composition adapted to produce high contrast ratio electrically induced light displays, comprising a liquid crystal mixture including a neumatic liquid crystal solvent and a cholesteric or chiral nematogenic compound, which mixture is stable when exposed to ultraviolet radiation and which is adapted to undergo a reversible electrically induced phase transition from a normal cholesteric phase, in which incident ultraviolet radiation is scattered, to an electrically induced nematic phase, in which incident ultraviolet radiation scattering is substantially reduced as compared to the cholesteric phase scattering, said composition further including a sufficient amount of a fluorescent compound, which is soluble in said mixture, which is excited by ultraviolet light scattered

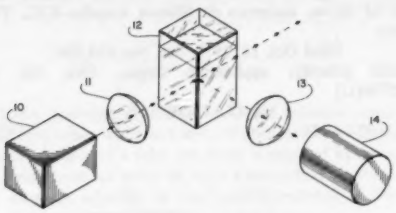
strongly in the cholesteric phase of the mixture but not in the electrically induced nematic state, and which significantly enhances the contrast ratio of the liquid crystal composition upon electrically induced phase transition, as viewed in the dark or under low ambient light conditions.

4,176,919

PASSIVE HIGH-SPEED AUTOMATIC SHUTTER FOR IMAGING DEVICES

Howard E. Rast, Jr., Solana Beach, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 31, 1978, Ser. No. 874,093
Int. Cl.[2] G02F *1/00*
U.S. Cl. 350—354 **11 Claims**



1. A passive, high-speed, automatic shutter for controlling the transmission of light energy of known wavelengths along a predetermined optical axis comprising:

a plurality of contiguously positioned micro-channel optical waveguides axially aligned parallel with said optical axis to intercept said light energy;

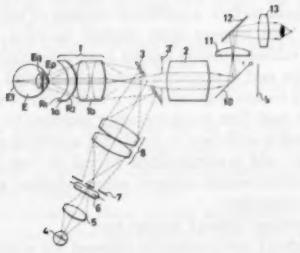
a saturable absorber material contained in each of said micro-channel optical waveguides having the property to absorb said known wavelengths of light energy up to a determinable level of intensity, and the saturable absorber material further having the property to transmit said known wavelengths of light energy when said determinable level of intensity is exceeded.

4,176,920

OPHTHALMOSCOPIC SYSTEM WITH A WIDE ANGLE OBJECTIVE LENS

Yuji Ito, Chigasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 17, 1977, Ser. No. 797,636
Claims priority, application Japan, May 19, 1976, 51-57466
Int. Cl.[2] A61B *3/14*
U.S. Cl. 351—7 **11 Claims**



1. An ophthalmoscopic system provided with a wide angle objective lens comprising;

an objective lens group opposed to a human eye and including at least one meniscus lens and positive lens, and said meniscus lens having a front surface concave to the human eye and being substantially an aplanatic lens having an aplanatic point, the aplanatic point being situated in the front part of the human eye;

a converging lens group positioned in rear of said objective lens group;

an illuminating system having at least one light source and light transmitting means, and the light emergent section of this system being directed toward the human eye; and

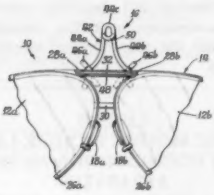
an observing optical system having said objective lens group and image transmitting means.

4,176,921

EYEGLASSES HAVING REMOVABLE LENSES

Jan H. Matthias, Greispinzgau, Austria, assignor to Carrera International Corporation, Norwood, N.J.

Filed Jun. 2, 1978, Ser. No. 912,022
Claims priority, application Fed. Rep. of Germany, Jun. 3, 1977, 7717685[U]
Int. Cl.[2] G02B *5/13, 21/26, 7/04*
U.S. Cl. 351—106 **15 Claims**



1. Eyeglasses of the type having removable lenses, comprising,

a pair of lenses,

frame means defining a pair of lens support sections and including bridge means interconnecting said lens support sections in laterally spaced relation,

means cooperative with said frame means and adapted to facilitate mounting of the eyeglasses on the wearer in predetermined relation to the wearer's eyes,

support means mounted on each of said lens support sections and adapted to releasably support a separate lens in supporting relation thereon,

and a retaining clip mounted on said frame means intermediate said lens support sections and movable between a first position which permits mounting said lenses on and removal from said lens suppport sections in supported relation with said support means, and a second position adapted for cooperation with said separate lenses to retain said lenses in supported relation on said lens support means so as to prevent removal of said lenses therefrom.

4,176,922

MICROPHONE ARRANGEMENT IN A SOUND MOVIE CAMERA

Johann Roth, Schwabhausen, and Peter Schneider, Kronberg, both of Fed. Rep. of Germany, assignors to Braun Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

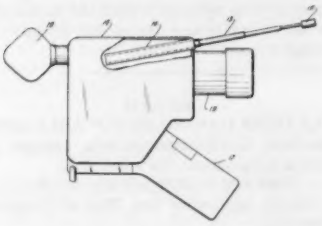
Filed Apr. 12, 1978, Ser. No. 895,716
Claims priority, application Fed. Rep. of Germany, Jun. 18, 1977, 2727496
Int. Cl.[2] G03B *31/02*
U.S. Cl. 352—27 **7 Claims**

1. In a sound movie camera having a housing accommodating a sound-recording circuitry and a microphone displaceable between a folded position in which the microphone is at least partially received in the housing and an unfolded position in which the microphone is completely removed from the housing, an arrangement comprising

a recess in the housing for accommodating at least a portion of the microphone; and

extendable means fully disposed within said recess when the

microphone is in the folded position thereof and at least partially disposed in said recess when the microphone is in the unfolded position, said means being connected between the housing and the microphone for supporting the latter in the unfolded position out of the housing and



connecting the microphone with the sound-recording circuitry in the housing so as to eliminate the necessity for separate mechanical and electrical connecting elements when the microphone is in the unfolded position, to thereby simplify the operation and handling of the sound movie camera.

4,176,923

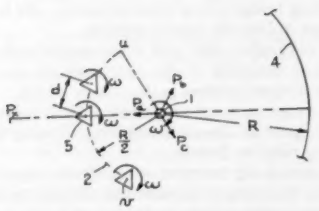
STEREOSCOPIC MOTION PICTURE LARGE SCALE SCANNING REPRODUCTION METHOD AND APPARATUS

Robert B. Collender, 709 Patterson Ave., Glendale, Calif. 91203

Filed Oct. 10, 1978, Ser. No. 949,502

Int. Cl.[2] G03B *35/00*

U.S. Cl. 352—58 **2 Claims**



1. A method of recording and reproducing stereoscopic views for observation by plural observers without visual acids at the eyes of said observers, comprising:

photographing multiple sequential views of a scene from a motion picture camera in a manner such that between each sequential view relative motion takes place between the camera and scene, and the optical axis of the camera for the various views is essentially coincident or parallel with each other; reproducing said views sequentially by projecting the views from a rotating and radially outward projecting multifacet scan projector; said scan projector rotating about a central vertical rotation axis; said views being projected toward a concentric cylindrical arc of elemental scanning mirrors synchronized in motion with said scan projector; said arc of scanning mirrors reflecting said sequential views to a concentric stationary concaved screen on the opposite side of said vertical axis; said screen comprised of highly reflective horizontal corrugated ridges to vertically scatter incident light rays from said scan projector, and to horizontally reflect said light rays; said camera optical axes of said sequential views being coincident with said scan projector optical axis when projecting said views onto the center of said screen, and laterally shifted with respect to said scan projector optical axis for off-center projection on said screen; said shifted camera optical axis occuring in said scan projector and being sufficient to cause said camera's optical axes reflection from said screen to remain essentially parallel during the horizontal sweep motion of said sequential views across said screen by said scan projector; said light rays in projected views reflective from said screen to pass through a vertical aerial exit slit moving in a concentric circle about said central vertical rotation axis; said aerial slit located between said screen and said axis; and the scanning rate of said projector sufficient to be within the period of persistence of vision of an observer.

4,176,924

SHUTTER RELEASE MECHANISM FOR CINECAMERA

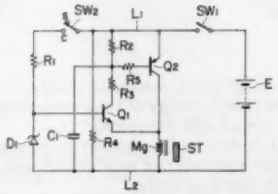
Nobuyoshi Hagiuda, Kawasaki, and Hiroaki Tanaka, Tokyo, both of Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed Oct. 18, 1977, Ser. No. 843,324

Claims priority, application Japan, Oct. 29, 1976, 51/145750[U]

Int. Cl.[2] G03B *1/00*

U.S. Cl. 352—174 **6 Claims**



1. A shutter release mechanism for a cinecamera having a shutter release button, a rotatable sector serving as a shutter for exposure of a film, a stopper for preventing the rotation of said sector, an electromagnet to be energized to selectively render said stopper operative and an electric circuit for supplying a current to said electromagnet when said shutter is released, said electric circuit comprising:

(a) a D.C. power source circuit for supplying an electric power to said electromagnet;

(b) a normally opened first switch means incorporated in said D.C. power source circuit and ganged with said release button to supply an electric power to said electromagnet when said release button is operated;

(c) a first semiconductor element inserted in said D.C. power source circuit for controlling a current through said electromagnet;

(d) a time constant circuit for allowing said first semiconductor element to flow a sufficient amount of said current to actuate said stopper from shutter latching position to shutter release position during a predetermined period of time after said first switch means closed; and

(e) control means responsive to a reduction of said current through said first semiconductor element to a predetermined value sufficient to hold said actuation of said stopper after said predetermined period of time for holding said predetermined current value wherein said control means comprises;

(a) a constant voltage means; and

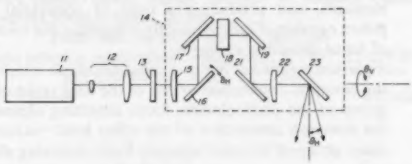
(b) a second semiconductor element for controlling said first semiconductor element so that the difference between said constant voltage and the voltage across said electromagnet is constant to thereby maintain said current through said second semiconductor element and said electromagnet substantially at said predetermined value in spite of variations in said D.C. power source circuit.

4,176,925

LASER SCANNER FOR PHOTOLITHOGRAPHY OF SLOTTED MASK COLOR CATHODE RAY TUBES

Robert C. Kocher, Harvard, and Alfred Piorkow, Sudbury, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Jun. 7, 1978, Ser. No. 913,730
Int. Cl.[2] G03B *41/00*
U.S. Cl. 354—1 10 Claims



1. Laser scanning apparatus for use in manufacturing color cathode ray tubes wherein a layer of photosensitive material on the inner surface of a tube faceplate is exposed by scanning a laser beam over an array of light transmitting apertures in a mask disposed adjacent to the layer of material on the faceplate, the apparatus including:

(a) a laser source for creating a light beam having a wavelength spectrum which exposes the photosensitive material;

(b) an optical stage coupled to receive the light beam from said laser source,

(c) a scan cradle enclosure, coupled to receive the light beam from said optical stage, said enclosure comprising

(i) a cradle base,

(ii) a cradle platform adapted for rotary motion with respect to said cradle base,

(iii) a cylindrical lens adapted to receive the light beam from said optical stage,

(iv) means for rotating said cylindrical lens about the axis of said light beam,

(v) a galvanometer,

(vi) a mirror, adapted to be rotated about an axis perpendicular to the axis of said light beam by said galvanometer, oriented to reflect the light beam after it emerges from said cylindrical lens,

(vii) diverging lens, for receiving light from said mirror,

(viii) converging lens, for receiving light from said diverging lens,

(ix) a scanning mirror adapted to receive the light beam from said converging lens,

(x) a first motor,

(xi) linkage coupled to said first motor for rotating said scanning mirror,

(xii) a lead screw assembly affixed to said cradle base for rotating said cradle platform,

(xiii) a second motor for rotating said lead screw assembly,

(xiv) a support frame, having an aperture therewithin, affixed to the top of said scan cradle enclosure, said aperture so oriented that light reflected by said scanning mirror passes therethrough,

(xv) an elevating plate, having an aperture therewithin, supported above said support frame, said plate aperture and said frame aperture being in general alignment,

(xvi) a translating jig plate, having a cut-out therewithin for supporting a face panel of a cathode ray tube, supported on said elevating plate, and adapted to be horizontally adjustable,

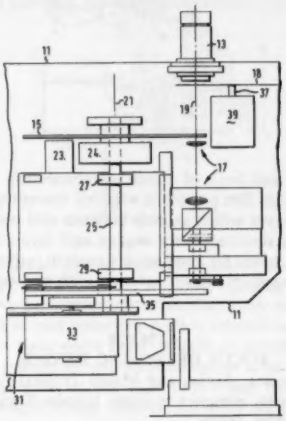
(xvii) a safety cover for covering a face panel supported in said cut-out of said jig plate.

4,176,926

OPTICAL PROJECTION APPARATUS

David W. Eadie, Corfe Mullen, and Charles J. Hancock, Bournemouth, both of England, assignors to Quest Automation Limited, Dorset, England

Filed Sep. 26, 1977, Ser. No. 836,827
Claims priority, application United Kingdom, Sep. 28, 1976, 40196/76; Jun. 3, 1977, 23646/77
Int. Cl.[2] G03B *29/00*
U.S. Cl. 354—4 5 Claims



2. Photodrafting equipment of the type comprising means for mounting a sheet having a photosensitive surface, a carriage movable in orthogonal coordinate directions parallel to said sheet, means for controlling the movement of said carriage, the carriage including means for projecting a beam of light to provide a spot of light on said photosensitive surface, which spot exposes a line on said photosensitive surface as a result of movement of said carriage, and means interposed in the beam of light for selectively defining the size and shape of said spot of light; said carriage movement controlling means including means for controlling the intensity of said spot of light, said intensity controlling means being movable across said beam of light in a timed sequence between stations in which there is provided a constant intensity of said spot of light in a first station, a progressively increasing or decreasing intensity of said spot of light in a second station, and a predetermined intensity of said spot of light for a timed period followed by substantially zero intensity of said spot of light in a third station; said intensity controlling means being operable to provide a constant intensity of said spot of light as said carriage moves at a constant rate and a progressively increasing or decreasing intensity of said spot of light as said carriage accelerates or decelerates from or to a halt condition, and said intensity controlling means being further operable to hold on said spot of light for a predetermined period of time in said halt condition of said carriage after which said intensity controlling means provides substantially zero intensity of said spot of light.

4,176,927

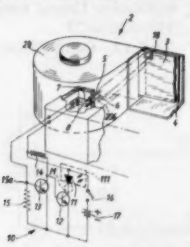
APPARATUS FOR DECODING INFORMATION STORED IN CONTAINERS FOR PHOTOGRAPHIC FILMS

Eduard Wagensonner, Aschheim, Fed. Rep. of Germany, assignor to AGFA-Gevaert, A.G., Leverkusen, Fed. Rep of Germany

Filed Jan. 12, 1978, Ser. No. 868,828
Claims priority, application Germany, Jan. 21, 1977, 2702989
Int. Cl.[2] G03B *17/18*
U.S. Cl. 354—21 15 Claims

1. In a photographic apparatus wherein a web of photographic film is transported in a predetermined direction along a predetermined path, together with a backing strip carrying

an opaque layer having a high ohmic resistance and facing one side of the film and wherein at least one portion of the film affords access to said layer from the other side of the film the combination of tracking means adjacent to a portion of said path and including two spaced-apart electric contacts at least one of which engages the other side of the film in line with said



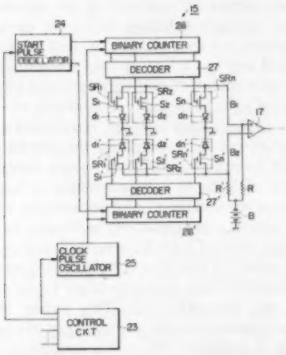
film portion and both of which simultaneously engage said layer when said film portion is adjacent thereto whereby that part of said layer which extends between said contacts, while said contacts simultaneously engage said layer, constitutes a resistor; and means for generating signals in response to simultaneous engagement of said contacts with said layer.

4,176,928

FOCUS DETECTING DEVICE

Kazuo Nakamura, Asaka, and Masao Jyojiki, Tsurugashima, both of Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 15, 1977, Ser. No. 861,089
Claims priority, application Japan, Dec. 15, 197[illegible], 51-150432
Int. Cl.[2] G03B *7/08*
U.S. Cl. 354—25 **8 Claims**



1. A focus detecting device for use in a camera including first and second groups of photoelectric focus detecting elements symmetrically juxtaposed on a substrate so as to have the same electrical characteristics and light receiving area for receiving light reflected from an object to be photographed through an optical focussing lens system of the camera, the improvement comprising:

a d.c. power source;

a first common load resistance element;

a first group of electrical switching elements having input, output and gate terminals, each of said switching elements being connected in series with a corresponding focus detecting element in said first group of focus detecting elements and all of the output terminals of said first group of switching elements being connected together and coupled to one terminal of said first common load resistance, the other terminal of which is coupled to said power source;

a second common load resistance;

a second group of electrical switching elements having input, output and gate terminals, each of said second group of switching elements being connected in series with a corresponding focus detecting element in said second group of focus detecting elements and all of the output terminals of said second group of switching elements being connected together and coupled to one terminal of said second common load resistance, the other terminal of which is coupled to said power source,

trigger pulse generating means having a plurality of output terminals coupled to the gates of said electrical switching elements, and producing a train of sequential trigger pulses capable of independently triggering the two groups of focus detecting elements;

comparison means having two input terminals coupled with the common connection of one of the load resistors to one group of the photoelectric focus detecting elements and the common connection of the other load resistor to the other group of the photoelectric focus detecting elements; and

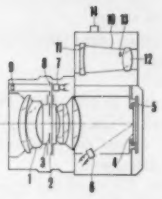
means for detecting the focus condition of the object's image formed through the optical focussing lens system on both the groups of photoelectric focus detecting elements in accordance with an output signal from the comparison means.

4,176,929

EXPOSURE CONTROL DEVICE FOR A CAMERA

Fumio Ito; Tokuichi Tsunekawa, both of Yokohama; Tetsuya Taguchi, Kawasaki, and Isao Harigaya, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 20, 1978, Ser. No. 917,375
Claims priority, application Japan, Jun. 21, 1977, 52-73512; Jun. 29, 1977, 52-77448; Jul. 14, 1977, 52-84411
Int. Cl.[2] G03B *7/08, 15/05, 19/12*
U.S. Cl. 354—29 **20 Claims**



1. An exposure control device for a camera, comprising:

a shutter which also functions as a diaphragm;

a first light receiving element which is capable of sensing light beams reflected from a film surface when said shutter is released;

a second light receiving element which is capable of sensing light beams coming from an object before said shutter is released;

an auxiliary diaphragm which is disposed in front of said second light receiving element and is responsive to opening and closing actions on said shutter, said auxiliary diaphragm being arranged to open so as to allow said light beams coming from said object to be incident on said second light receiving element when said shutter closes and to close so as to prevent said light beams from said object from falling on said second light receiving element when said shutter opens; and

light measuring means having the first light receiving element and the second light receiving element, the light measuring means having an operational amplifier for light measuring, which has the first light receiving element and the second light receiving element connected in parallel between input terminals of the operational amplifier:

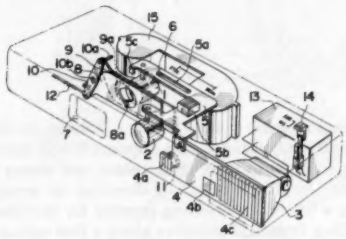
wherein exposure control is performed based on an output value of the operational amplifier corresponding to an amount of incident light into the first light receiving element, and, at the time the shutter is released, delay in transient response of the light measuring means is reduced based on said output value of the operational amplifier corresponding to an amount of incident light into the second light receiving element.

4,176,930

CAMERA WITH SELF-CONTAINED FLASH DEVICE

Toshinori Imura, Sakai, Japan, assignor to Minolta Camera Kabushiki Kaisha, Sakai, Japan

Filed Mar. 6, 1978, Ser. No. 883,556
Claims priority, application Japan, Mar. 7, 1977, 52-23924
Int. Cl.[2] G03B *7/00, 9/02, 15/03*
U.S. Cl. 354—59 **9 Claims**



1. A camera comprising;
a camera body having a picture-taking optical path;
a first objective lens having a predetermined focal length and a predetermined F-number;
a second objective lens having a focal length and an F-number greater than those of said first objective lens;
externally operable change-over means for selectively setting said first or second lens into registry with said picture-taking optical path;
a flash device having an irradiating angle substantially coincident with the angle of view of said second objective lens; and
an irradiating angle changing means movable between an inoperative position and an operative position, at which said changing means enlarges the irradiating angle of said flash device to substantially correspond with the angle of view of said first objective lens, said irradiating angle changing-means being responsive to said change-over means and being normally maintaintained in an inoperative position and transferred to its operative position only when said first objective lens is in registry with said picture-taking optical path.

4,176,931

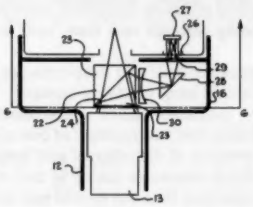
CAMERA TO MICROSCOPE ADAPTER SYSTEM WITH PERIPHERAL IMAGE AVERAGING MEANS FOR EXPOSURE CONTROL

John Taube, 2130 NW. 31st Ave., Apt. F-6, and Andris Taube, 1901 NW. 38th Dr., both of Gainesville, Fla. 32605

Filed May 30, 1978, Ser. No. 910,697
Int. Cl.[2] G03B *17/48;* **G02B** *21/00*
U.S. Cl. 354—79 **8 Claims**

1. In a camera to microscope adapter system of the type that extracts a part of the focused image received from said microscope to operate an exposure control mechanism for said camera having in combination an adapter housing which fastens and aligns said camera to said microscope, means located within and held in place by said adapter housing to separate said part of said focused image and redirect said part of said focused image, and conventional collecting and directing means also connected to said adapter housing which receive and deliver said part of said focused image to said exposure control mechanism, the improvement in said means to separate said part of said focused image for exposure control comprising:

A reflective surface encased within and held in place by said adapter housing, said reflective surface being positioned to cut through the right angle cone of light formed by said focused image below the apex and other than parallel to the base of the cone, said reflective surface being further positioned to direct all parts of said focused image which strike said reflective surface to said conventional collecting and directing means which deliver said parts of said



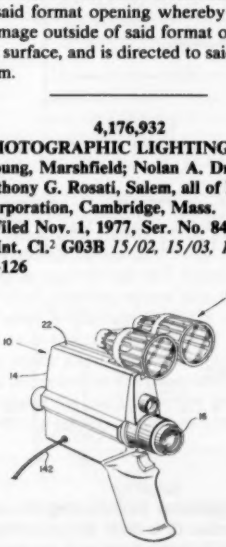
focused image to said exposure control mechanism, said reflective surface having a format opening through said reflective surface which is geometrically defined by the location of said reflective surface relative to said camera and said right angle cone of light to permit only a film format portion of said focused image which falls within the boundaries of the film within said camera to pass through said format opening whereby the remaining peripheral image outside of said format opening strikes said reflective surface, and is directed to said exposure control mechanism.

4,176,932

PHOTOGRAPHIC LIGHTING UNIT

Warren H. Young, Marshfield; Nolan A. Drevitch, South Easton, and Anthony G. Rosati, Salem, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Nov. 1, 1977, Ser. No. 847,534
Int. Cl.[2] G03B *15/02, 15/03, 17/02*
U.S. Cl. 354—126 **14 Claims**



1. A lamp accessory for a camera, said accessory comprising:
a pair of lamp-reflector assemblies, each said assembly including a forwardly facing lamp, an open-ended forwardly facing reflector extending around said lamp and a pair of rearwardly extending substantially parallel electrical terminals spaced apart a given distance and having their other ends electrically coupled to said assembly lamp;
a main body support including a base portion adapted to seat on a portion of the camera and a wall portion arranged to face rearwardly when said base portion is properly seated on the camera, said wall portion having a pair of spaced apart tracks formed thereon extending upwardly from

said base portion and respectively turning in opposite directions intermediate said base portion and the end of said wall portion opposite said base portion and another track formed thereon and extending thereacross spaced from said pair of tracks intermediate said pair of tracks and said end of said wall portion;

a pair of lamp receiving and positioning cup members respectively coupled to opposite sides of said main body support, each said lamp receiving member having heat dissipating openings formed therearound and mounting one of said lamp-reflector assemblies therein with said lamp's electrical terminals extending rearwardly beyond a plane extending through said main body support's wall portion;

means for retaining each of said lamp-reflector assemblies in its respective said lamp receiving member;

a first electrical connector seated in said another track and extending from a first said terminal of one of said lamps to a first said terminal of the other of said lamps;

a second electrical connector seated in one of said pair of tracks and extending from the second said terminal of said one lamp to a point below said base portion of said main body support;

a third electrical connector seated in the other of said pair of tracks and extending from the second said terminal of said other lamp to a point below said base portion of said main body support; and

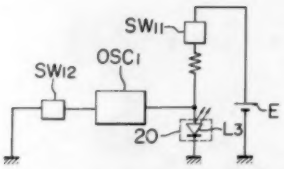
means cooperating with said lamp receiving members and said main body support for capping said electrical terminals of said lamps and said first, second and third electrical connectors.

4,176,933

INDICATING APPARATUS FOR CAMERA

Sakuji Watanabe, Warabi, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Mar. 6, 1978, Ser. No. 883,645
Claims priority, application Japan, Mar. 5, 1977, 52-23315
Int. Cl.[2] G03B *15/05, 17/18*
U.S. Cl. 354—127 **7 Claims**



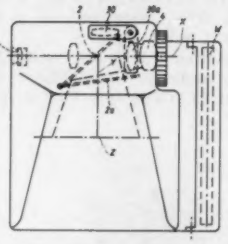
1. An indicating apparatus for indicating the completion of charging of a capacitor of a flash device to be actuated in connection with the shutter release of a camera and also for indicating that the shutter speed selected by a shutter speed setting means of the camera is synchronizable with the light from the flash device, comprising an illuminable indicating element capable of being placed in different states, and operating means responsive to the charging of said capacitor and to said shutter speed setting means for causing said indicating element to have a predetermined first state when charging of said capacitor is complete and the selected shutter speed is synchronizable with the light from said flash device, for causing said indicating element to have a predetermined second state when charging of said capacitor is complete and the selected shutter speed is non-synchronizable with the light from said flash device, and for causing said indicating element to have neither of said first and second states when charging of said capacitor is in process but is incomplete.

4,176,934

ARRANGEMENT OF A PHOTOGRAPHIC CAMERA

Peter Lermann, Narring, and Günter Fauth, Unterhaching, both of Fed. Rep. of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Fed. Rep. of Germany

Filed Mar. 9, 1978, Ser. No. 885,074
Claims priority, application Fed. Rep. of Germany, Mar. 10, 1977, 2710414
Int. Cl.[2] G03B *15/00, 17/50, 17/04, 13/02*
U.S. Cl. 354—150 **8 Claims**



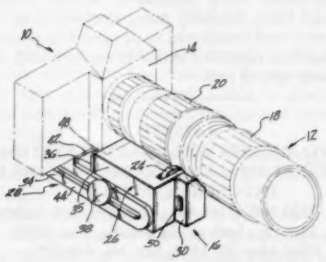
1. In a photographic camera having a housing, an objective in one wall of the housing, means disposed in said housing for supporting a film strip in an image plane, and means for advancing the film strip in a feeding direction, an arrangement comprising a first light reflecting member for deviating light rays travelling from said objective along a first optical axis, a second light reflecting member for deviating light rays travelling thereto from said first light reflecting member along a second optical axis, said second light reflecting member deviating said light rays along a third optical axis towards said film strip supporting means, said first optical axis and said second optical axis defining a first plane that is different from a second plane defined by said second optical axis and said third optical axis.

4,176,935

MOTORIZED LENS RING ADJUSTOR FOR STILL CAMERA LENS

George Smith, 166 Vine Rd., Stamford, Conn. 06905

Filed Oct. 25, 1977, Ser. No. 844,800
Int. Cl.[2] G03B *13/02*
U.S. Cl. 354—195 **14 Claims**



1. A self-contained accessory apparatus for use with a wide variety of shapes and sizes of still cameras of the type having a still camera body, a lens with a first rotatable adjustment ring and an accessory connector, said apparatus comprising:

(a) connector means for releasably attaching the apparatus to one of the camera body and lens;

(b) wheel means for engaging the first adjustment ring;

(c) self-contained motor means for engaging said wheel and rotating the first adjustment ring by rotating said wheel responsive to a signal;

(d) manual switch means, operably connected to said self-

contained motor means, for selectively providing said signal in response to manipulation of said switch means regardless of the inclination of the camera; and

(e) bracket means, attached to said motor means and said connector means, for adjustably positioning said wheel means into engagement with the adjustment ring.

4,176,936

MOTOR DRIVE UNIT FOR A CAMERA

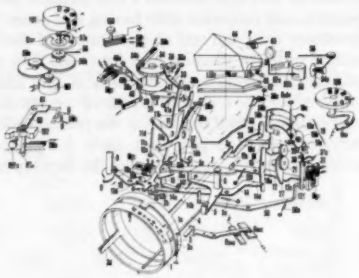
Susumu Kozuki; Masanori Uchidoi, both of Yokohama; Nobuaki Date, Kawasaki; Masami Shimizu, Tokyo; Hiroshi Aizawa, Kawasaki, and Yoshiyuki Takishima, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 19, 1977, Ser. No. 861,905

Claims priority, application Japan, Dec. 24, 1976, 51/155995

Int. Cl.[2] **G03B** *7/10, 1/18*

U.S. Cl. 354—38 **17 Claims**



1. A camera having a motor drive device comprising:

A. a camera body including:

(a) light measuring means for producing an electrical signal in accordance with the brightness of the object to be photographed,

(b) shutter time setting means for setting a shutter time value and having adjustable signal forming means for producing an electrical signal in accordance with the shutter time value to be set,

(c) exposure calculating means responsive to the electrical signal from the light measuring means and the electrical signal from the shutter time setting means for producing an electrical signal based on the signals from the light measuring means and the setting means in accordance with the calculated value,

(d) aperture control means for controlling the aperture in accordance with the output of the exposure calculating means,

(e) shutter time control means for controlling the shutter time during an exposure operation in accordance with the electrical signal output of the shutter time setting means,

(f) first drive means for causing adjustment of the signal forming means, and

(g) first drive control means for controlling the first drive means,

B. a motor drive device including:

(h) a second drive means for carrying out a charge operation at the aperture control means and the shutter time control means,

(i) second drive control means for driving the second drive means, second drive control means being enabled upon completion of the exposure operation of the shutter time control means to control the shutter time and being disabled upon completion of the charge operation of the shutter time control means,

(j) signal producing means for producing an electrical signal in accordance with the longest shutter time allowable for one picture frame at a particular picture frame speed, and

(k) comparison means for comparing the electrical signal of the signal producing means with the electrical signal of the shutter time setting means and for operating the first drive control means in response to a difference at the comparison means.

4,176,937

FINDER SYSTEM FOR PHOTOGRAPHING APPARATUS

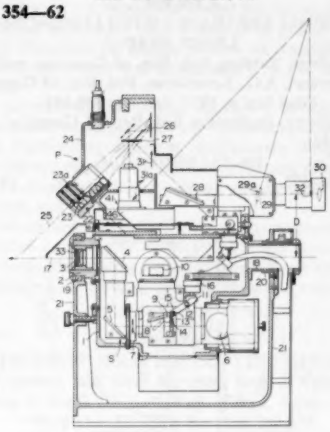
Suminosuke Kawase, Ohmiya, Japan, assignor to Tokyo Kogaku Kikai Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 14, 1978, Ser. No. 877,674

Claims priority, application Japan, Feb. 18, 1977, 52-1889577[U]; Feb. 21, 1977, 52-1851377; Feb. 21, 1977, 52-1851477

Int. Cl.[2] **G03B** *29/00*

U.S. Cl. 354—62 **4 Claims**



1. In a photographing apparatus including a photographing optical axis and a photographing film plane which is inclined from a right angle with respect to the photographing optical axis, a finder system comprising relay lens means, eye lens means having an optical axis and means for reflecting light through the photographing optical axis toward the relay lens means, said relay lens means having a major plane inclined with respect to an optical axis of the eye lens means in such a way that the major plane intersects a plane containing a first image in said finder system in a plane which is perpendicular to the optical axis of the eye lens means and passing through a position wherein a second image is produced.

4,176,938

ROLL FILM CASSETTE

Rudolf Weiss, Grünwald; Werner Kiessling, Unterhaching, and Otto Wiedemann, Starnberg, all of Fed. Rep. of Germany, assignors to Agfa-Gevaert AG, Leverkusen, Fed. Rep. of Germany

Filed Jul. 7, 1978, Ser. No. 922,740

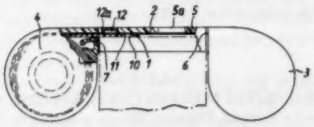
Claims priority, application Fed. Rep. of Germany, Jul. 11, 1977, 7721745[U]

Int. Cl.[2] **G03B** *17/26*

U.S. Cl. 354—275 **7 Claims**

1. A roll film cassette, comprising a film supply chamber for unexposed film and having a film outlet; a film take-up chamber for exposed film and having a film inlet; a web connecting said chambers and having a film window across which the film travels in a plane from said outlet to said inlet; and means on said cassette, including a springy arm intermediate said film window and said inlet and normally extending substantially parallel to said plane, said arm having a free end closer to said

inlet than to said window and provided with a projection riding on the film for engaging in a cut-out proximal to a



trailing end of the film when the same approaches said inlet so as to prevent the trailing film end from entering said inlet.

4,176,939

DEVELOPING APPARATUS WITH CONTACT-FREE LIGHT TRAP

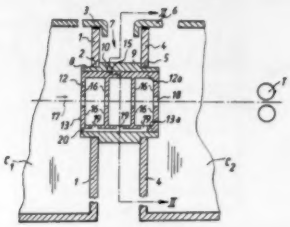
Jürgen Leuchter, Tutzing, Fed. Rep. of Germany, assignor to AGFA-Gevaert, A.G., Leverkusen, Fed. Rep. of Germany

Filed Sep. 6, 1977, Ser. No. 830,442

Claims priority, application Fed. Rep. of Germany, Sep. 9, 1976, 2640634

Int. Cl.[2] G03D *13/04*

U.S. Cl. 354—307 **18 Claims**



1. In an apparatus for developing photographic materials, a combination comprising at least two adjacent containers each adapted to contain a treating bath for photographic material, said containers having respective ports which face one another; and means forming a passage which connects said ports and through which the photographic material travels from one to the other of said containers, including light trap means in said passage which defines for the photographic material a substantially straight-line travel path dimensioned and configurated for avoiding contact of said light-trap means with emulsion-carrying surfaces of said photographic material, said light-trap means including a circumferential wall and a plurality of baffles projecting inwardly of said wall at locations spaced lengthwise of said passage and forming at least two compartments through which the photographic material is compelled to pass.

4,176,940

ELECTROPHOTOGRAPHIC COLOR IMAGE PRODUCING APPARATUS

Noboru Katakabe, Katano; Isao Yamaguchi, Yawata, and Masaru Onishi, Neyagwa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Feb. 28, 1978, Ser. No. 882,951

Claims priority, application Japan, Mar. 9, 1977, 52-26514

Int. Cl.[2] G03G *15/10*

U.S. Cl. 355—10 **18 Claims**

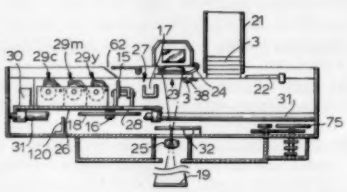
1. An electrophotographic color image producing apparatus for producing on an electrophotographic film a color image of an original, comprising:

a housing

film unit holding means supported by said housing for holding at a processing position a film unit comprising an electrophotographic film having a major surface facing downwards;

processing means arranged in said housing for processing an image on said major surface of said film, said processing means comprising a charger for applying a uniform electrostatic charge on said major surface of said film, an exposure unit for applying light from an original to the charge-bearing major surface of said film to form a latent image, n developer units (n being an integer larger than 1) each containing a liquid developer for developing said latent image to a visible image, and a dryer for drying the visible image-bearing major surface of said film, said exposure unit including a lens unit supported by said housing for focusing said light from the original on said charge-bearing major surface of said film;

a processor table slidably mounted in said housing and reciprocally movable along a horizontal path under said major surface of said film between a first position and a second position, said processor table having said dryer, said plural developer units and said charger mounted thereon in this recited order in the direction from said first position to said second position so that each of said charger, said plural developer units and said dryer passes said processing position for said film unit in this recited order upon the movement of said processor table for performing the charging step, the exposing step, the developing step and



the drying step at said processing position in this recite order;

driving means coupled to said processor table for reciprocally moving said processor table between said first position and said second position; and

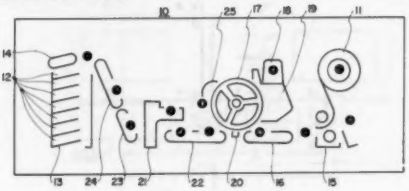
developer operating means for being selectively coupled to the mth one of said n developer units (m being an integer defined by $1 \leqq m \leqq n$) for operating said mth developer unit to apply said liquid developer in said mth developer unit to said major surface of said film when said mth developer unit is positioned at said processing position in an mth reciprocal movement of said processor table, and in one reciprocal movement of said processor table, for being released from said mth developer unit, and for then being coupled to an $(m+1)$th developer unit for operating said $(m+1)$th developer unit to apply said liquid developer in said $(m+1)$th developer unit to said major surface of said film when said $(m+1)$th developer unit is positioned at said processing position in an $(m+1)$th reciprocal movement of said processor table;

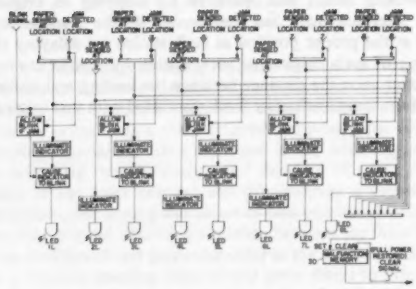
whereby during n reciprocal movements of said processor table between said first and said second position, n cycles each constituting a charging step, an exposing step, a developing step and a drying step are performed for the respective liquid developers in said n developer units for producing a color image on said major surface of said film.

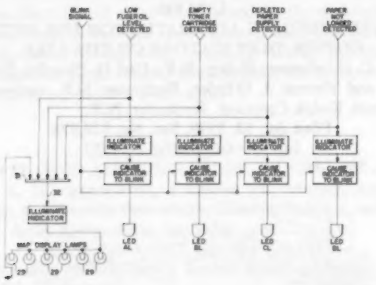
4,176,941
MALFUNCTION DISPLAY SYSTEM FOR ELECTROPHOTOGRAPHIC COPYING MACHINES

Fred J. Breitenkam, Randolph, and James E. Landrith, Andover, both of N.J., assignors to Van Dyk Research Corporation, Whippany, N.J.

Filed Feb. 27, 1978, Ser. No. 881,195
Int. Cl.[2] G03G *15/00*; B65H *7/02*
U.S. Cl. 355—14 R **7 Claims**







1. In combination with an electrophotographic copying machine including:

(a) means for utilizing copy paper and other consumable items and for moving sheets of said copy paper along a predetermined path through said machine while forming visible images on said sheets,

(b) jam detection means for monitoring the movement of paper sheets along said path at preselected points thereof, and for generating (i) a jam occurrence signal indicative of the occurrence of a paper jam along said path, and (ii) a jam location signal indicative of that one of said preselected points at which the jam was detected,

(c) paper detection means for sensing the presence of paper sheets at various points along said path and for generating a number of paper presence signals indicative of the locations of corresponding paper sheets disposed along said path, and

(d) consumable item monitoring means for sensing the quantity of each of said consumable items and for generating a depleted consumable item identification signal indicative of each particular item which has been depleted to a quantity less than a predetermined value,

a malfunction display system comprising:

a pictorial display showing elements of said machine defining said paper path, said display including (i) paper path illuminating means for selectively illuminating portions of said display corresponding to each of said preselected points and each of said various points along said paper path, and (ii) consumable item symbols and means for selectively illuminating a point adjacent each of said symbols;

malfunction display enabling means responsive to said jam occurrence signal and to said depleted consumable item identification signals for illuminating said pictorial display;

jam display means responsive to said jam location signal for actuating said paper path illuminating means to distinctively illuminate the display portion corresponding to that one of said preselected points at which the jam was detected;

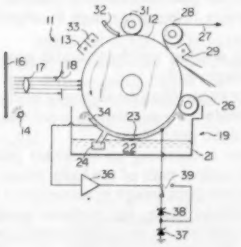
paper presence display means responsive to corresponding ones of said paper presence signals for actuating said paper path illuminating means to distinctively illuminate portions of said display corresponding to those of said various points along said paper path at which paper sheets are present; and

depleted consumable item display means responsive to said depleted consumable item identification signals for distinctively illuminating points adjacent those symbols corresponding to consumable items requiring replenishment.

4,176,942
ELECTROPHOTOGRAPHIC COPYING APPARATUS

Susumu Tatsumi, and Shoji Kuroishi, both of Tokyo, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Jan. 27, 1977, Ser. No. 763,175
Claims priority, application Japan, Feb. 2, 1976, 51-10185
Int. Cl.[2] G03G *15/00, 15/10*
U.S. Cl. 355—14 R **10 Claims**



1. An electrophotographic apparatus comprising:

a photoconductive member;

charging means for electrostatically charging the photoconductive member;

imaging means for radiating a light image of an original document onto the photoconductive member to produce an electrostatic image thereon;

developing means for applying a toner substance to the photoconductive member to develop the electrostatic image into a toner image;

a bias electrode disposed adjacent to the photoconductive member;

light image intensity regulating means for regulating an intensity of the light image to a plurality of different intensities;

bias voltage producing means for producing a bias voltage which is applied to the bias electrode;

limiting means for limiting the bias voltage to a plurality of different bias voltages in accordance with an electrostatic

potential of the electrostatic image on the photoconductive member; and

control means for controlling the limiting means to limit the bias voltage to a first predetermined voltage which is lower than a bias voltage for normal document reproduction when the intensity of the light image is a first intensity which is equal to an intensity for normal document reproduction and controlling the light image intensity regulating means to limit the intensity of the light image to a second intensity which is higher than the first intensity when the bias voltage is a second predetermined voltage which is higher than the first predetermined voltage and equal to a bias voltage for normal document reproduction.

4,176,943

ELECTROPHOTOGRAPHIC APPARATUS

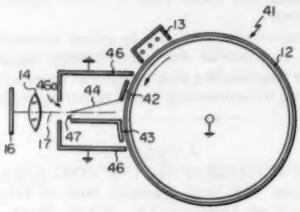
Mitsuo Hasebe, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Oct. 11, 1977, Ser. No. 840,614

Claims priority, application Japan, Oct. 18, 1976, 51/124670; Nov. 18, 1976, 51/138980; Nov. 18, 1976, 51/138981

Int. Cl.[2] **G03G** *15/00;* **G03B** *27/76*

U.S. Cl. 355—14 R **14 Claims**



1. An electrophotographic apparatus comprising:

charging means for forming an electrostatic charge on a photoconductive member;

imaging means for radiating a light image of an original document onto the photoconductive member to form an electrostatic image thereon through localized photoconduction;

sensor means for sensing an electrostatic potential of the electrostatic image; and

control means for controlling an intensity of light radiation of the photoconductive member in accordance with the sensed electrostatic potential;

the control means comprising an occluder plate movably provided in an optical path of the light image for varying the intensity of the light image in accordance with a position of the occluder plate, the occluder plate being disposed closely adjacent to the photoconductive member, the occluder plate being positioned by electrostatic force in accordance with an electrostatic potential induced thereon by the photoconductive member.

4,176,944

CORRECTLY POSITIONING SUCCESSIVE ORIGINALS OF A PHOTOGRAPHIC STRIP AT A COPYING OR SEVERING STATION

Bernd Payrhammer, Munich, Fed. Rep. of Germany, assignor to AGFA-Gevaert, A.G., Leverkusen, Fed. Rep. of Germany

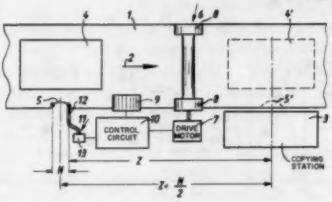
Filed May 2, 1978, Ser. No. 902,267

Claims priority, application Fed. Rep. of Germany, May 12, 1977, 2721368

Int. Cl.[2] **G03B** *27/52;* **G06K** *7/015;* **B65H** *23/18*

U.S. Cl. 355—18 **10 Claims**

1. In an apparatus for the processing of photographic strips comprised of successive originals transported along a predetermined path, and including a station at which successive originals of the transported strip are to be stopped with accurate positioning of the originals at such station, the originals of the photographic strip being provided with spatially correlated optically detectable reference marks, a positioning arrangement comprising transport means for transporting the strip along the predetermined path through such station; optical mark-sensing means located upstream of such station a predetermined distance and operative for detecting the leading and trailing ends of reference marks on the strip; and control circuit



means connected to the transport means and to the optical mark-sensing means and operative for stopping an original whose reference mark has been sensed by the mark-sensing means at the proper position at such station by delaying the stopping of such original at such station by a time interval dependent upon the distance between the leading and trailing ends of the sensed reference mark associated with that original.

4,176,945

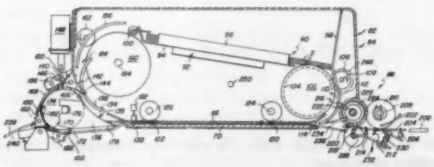
SHEET FEEDING APPARATUS FOR USE WITH COPIER/DUPLICATORS OR THE LIKE

Ronald C. Holzhauser, Holley, N.Y.; Carl H. Zirngibl, DeBary, Fla., and Vincent J. O'Brien, Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 12, 1978, Ser. No. 923,874

Int. Cl.[2] **G03B** *27/32, 27/52*

U.S. Cl. 355—23 **11 Claims**



6. A combination recirculating sheet feeder and document positioner for feeding document sheets from supporting means to an exposure station spaced from the supported means, the feeder and positioner comprising:

means defining a recirculating sheet path having a first portion extending from said supporting means to the station and having a second portion extending from the station back to the supporting means;

means defining a non-recirculating sheet path extending to the statior and away from the station and being at least partially coextensive with said recirculating sheet path in the area of the station, said non-recirculating sheet path having entrance and exit portions that diverge from the recirculating sheet path; and

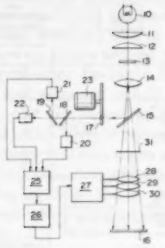
drive means for advancing document sheets along the respective sheet paths.

4,176,946

COLOR PRINTER AND METHOD OF CONTROLLING EXPOSURE TIME THEREFOR

Koji Takahashi, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Jul. 19, 1977, Ser. No. 817,059
Claims priority, application Japan, Jul. 20, 1976, 51-86275
Int. Cl.[2] G03B 27/78
U.S. Cl. 355—38 7 Claims



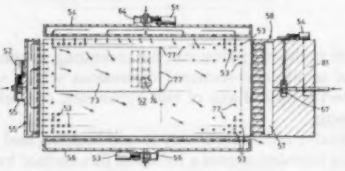
1. A method of controlling exposure time in a color printer in which at least two different color filters are used and the insertion time thereof is controlled to reproduce a preferable color on prints from a color original comprising the steps of selecting a particular color contained in the color original by (a) measuring three primary color densities of a number of points of the color original and (b) detecting a preselected particular color among the colors of said number of points of the color original, obtaining a relation between the three mean color densities of said particular color in the color original and the preferable insertion time of said color filters to print said particular color into the particular color of preferable color balance and density on the color paper, and controlling the insertion time of said color filters based on the obtained relation according to the said three mean color densities of the particular color in the color original, thereby printing the particular color in the color original into the particular color of preferable color balance and density.

4,176,947

STEP AND REPEAT MECHANISM

Harry A. H. Spence-Bate, 1 Cheam Pl., Morley, Australia (6062), and Timothy Bain-Smith, Charing, England, assignors to H. A. H. Spence-Bate, Australia

Filed Oct. 3, 1977, Ser. No. 838,724
Claims priority, application United Kingdom, Oct. 4, 1976, 41118/76
Int. Cl.[2] G03B 27/32, 27/42, 27/62
U.S. Cl. 355—53 17 Claims



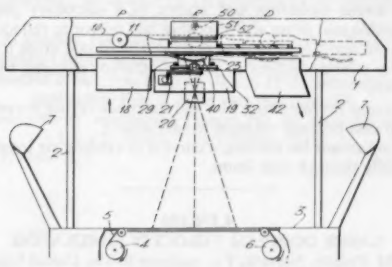
16. Apparatus for moving sheet material comprising two opposed plates, said plates being separated to provide a space therebetween, ducts formed in at least one of said plates opening into said space to form a gas cushion in said space between the plates for supporting said sheet material in said space, one or more sweep members positioned for movement between the plates to locate an edge of the sheet material in a required X and Y position between the plates.

4,176,948

RECORDING AND COPYING CAMERA

Harry A. H. Spence-Bate, 1 Cheam Pl., Morley, Western Australia 6062, Australia

Filed Mar. 15, 1978, Ser. No. 886,746
Claims priority, application Australia, Mar. 25, 1977, PC9578
Int. Cl.[2] G03B 27/42, 27/62, 27/64
U.S. Cl. 355—53 9 Claims



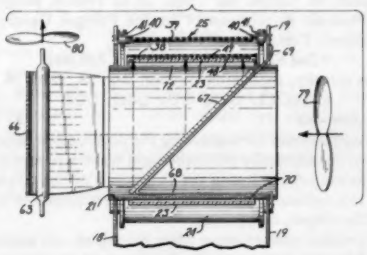
1. A microfiche camera having a microfiche store at a pick-up station, a camera lens at a filming and copying station, film disposal means at a dump station, film shift means for moving a microfiche film along a film shift path from one said station to each other said station, vacuum operated film retaining means comprising a frame having a film retaining surface surounding a masking aperture in the frame and at least one vacuum duct opening into said surface connectable to a source of vacuum, light means arranged to project light through said masking aperture, a shutter closing said aperture and between the aperture and the camera lens, a copying table in the front focal plane of the camera lens and means for positioning said film retaining means at a first reception level within the optical axis of said camera lens for receiving and recording an image and at a second copying level within the optical axis of said lens for copying a recorded image whereby a precise 1:1 record is obtained without refocusing said camera lens.

4,176,949

MICROFICHE EXPOSER

Dennis A. Burgess, Minneapolis, Minn., assignor to Burgess Industries, Inc., Minneapolis, Minn.

Filed Aug. 3, 1978, Ser. No. 930,855
Int. Cl.[2] G03B 27/22
U.S. Cl. 355—104 7 Claims



1. A microfiche exposer comprising:
(a) a housing;
(b) a rotary open-ended tubular drum of transparent material;
(c) means supporting said drum in said housing for rotation on its own axis;
(d) a pair of spaced apart feed rolls journaled within said housing on axes parallel to the axis of said drum;
(e) a flexible belt entrained over said feed rolls and having a

feeding flight between said rolls entrained over a circumferentially extended outer surface portion of said drum for reception of a master film and a sensitized sheet in face-to-face engagement between said outer surface portion of the drum and said feeding flight;

(f) an ultraviolet lamp mounted in said housing axially outwardly of one end of said drum and disposed to direct ultraviolet light axially into said drum;

(g) a mirror;

(h) means mounting said mirror in a stationary position within said drum and disposing said mirror to reflect light from said lamp in a direction radially of said drum toward the interior surface of the area thereof engaged by said belt;

(i) means for imparting film and sheet conveying movement to said belt and rotation to said drum;

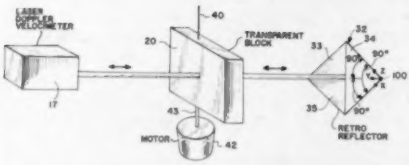
(j) and means for moving a current of cooling air longitudinally through said drum.

4,176,950

LASER DOPPLER VELOCITY SIMULATOR

John M. Franke, Norfolk, Va., assignor to The United States of America as represented by the United States National Aeronautics and Space Administration, Washington, D.C.

Filed Jul. 28, 1978, Ser. No. 929,083
Int. Cl.[2] G01P *3.36;* G01J *1/02*
U.S. Cl. 356—28 **9 Claims**



4. A laser doppler velocity simulator comprising a uniformly refractive transparent block and means to rotate said block to continuously change the optical path length of a laser light beam passing therethrough thereby inducing a doppler frequency shift in the laser light beam.

4,176,951

ROTATING BIREFRINGENT ELLIPSOMETER AND ITS APPLICATION TO PHOTOELASTICIMETRY

André J. Robert, Paris; Claude G. Bourdon, Igny; Nessim C. Msika, Sarcelles; Etienne G. Chorlay, Paris, and Jean-Louis Euzenade, St. Michel sur Orge, all of France, assignors to Etat Francais as represented by the Pelegue General pour l'Armement, Paris, France

Filed Sep. 20, 1977, Ser. No. 835,004
Claims priority, application France, Sep. 23, 1976, 76 28555
Int. Cl.[2] G01J *4/04;* G01L *1/24*
U.S. Cl. 356—33 **21 Claims**

1. An ellipsometer for measuring the polarization parameters α and λ of an elliptically polarized light wave wherein α corresponds to the orientation of the major axis of the ellipse with respect to a reference direction and λ corresponds to the flatness of the ellipse, comprising

an orientable quarter-wave plate having an orientation β,

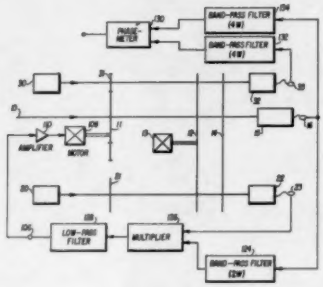
a birefringent plate rotatable at a constant angular speed ω,

a first polarizer,

a first photodetector for receiving said light wave and generating signal components having angular frequencies of 2ω and 4ω, said light wave traversing said quarter-wave plate, said birefringent plate and said polarizer before impinging on said first photodetector,

first and second reference signal generating means for generating signals having angular frequencies of 2ω and 4ω respectively,

synchronous detection means coupled to said first photodetector and to one of said first and second reference signal generating means for synchronously detecting the signal components at the output of said first photodetector, said polarization parameter α being obtained by adjusting said quarter-wave plate until the synchronously detected signal component is reduced to zero, the orientation of said quarter-wave plate then corresponding to α, and,



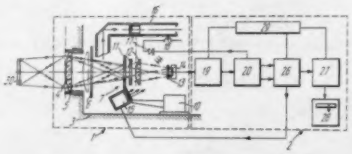
phase measuring means coupled to said first photodetector and said second reference signal generating means for measuring the phase of the component at the output of said first photodetector having an angular frequency of 4ω, said phase corresponding to the polarization parameter λ.

4,176,952

PHOTOELECTRIC PYROMETER FOR MEASURING TEMPERATURE OF BODIES OF SMALL CROSS-SECTIONAL DIMENSIONS WHICH VARY WITH RESPECT TO OPTICAL AXIS OF PYROMETER

Anatoly S. Bezvulyak; Ilya M. Gelfand; Efim M. Torchinsky; Sergei B. Pushkin; Rudolf K. Vedernikov; Gennady P. Kulachenkov, all of Magnitogorsk Chelyabinskoi; Petr F. Tkachuk, Kolomnya Ivano-Frankovskoi, and Viktor F. Karyagin, Magnitogorsk Chelyabinskoi, all of U.S.S.R., assignors to Vsesojuznynauchno-Issledovatelsky Institut Metlznol Promyshlennosti (Vniimetiz), U.S.S.R.

Filed Mar. 31, 1978, Ser. No. 892,091
Int. Cl.[2] G01J *5/52, 5/62*
U.S. Cl. 356—47 **1 Claim**



1. A photoelectric pyrometer for measuring temperatures of bodies of small cross-sectional dimensions which vary with respect to the optical axis of said pyrometer, comprising:

a housing;

an objective secured movably in said housing, said objective being intended to pass a radiation flux emitted by a heated body and produce an image of said heated body;

a stationary field diaphragm having an aperture and arranged in said housing behind said objective, across the path of said radiation flux, said radiation flux passing through said aperture of said stationary field diaphragm;

a slit obturator having a slit and a leg and arranged in said housing behind said stationary field diaphragm, across the path of said radiation flux, and intended to produce a first train of light pulses as its slit scans the image of the heated body;

an aperture diaphragm having an aperture and arranged in said housing behind said slit obturator, across the path of said first train of light pulses, which light pulses are passed through said aperture of said aperture diaphragm;

a condenser arranged in said housing behind said aperture diaphragm, across the path of said first train of light pulses, said condenser being sighted at said aperture of said stationary field diaphragm and intended to produce a sharp pulsating-illuminance image of said aperture of said stationary field diaphragm in its sharp image plane;

an optical feedback radiation source having an input and intended to emit a luminous flux to be converted by said leg of said obturator into a second train of light pulses;

a photoelectric converter having a light-sensitive surface and an output, and arranged in said sharp image plane of said condenser, said light-sensitive surface receiving said first and second trains of light pulses converting said two trains of light pulses into two trains of trapezoidal electric pulses of a variable duration and on-off ratio;

an amplifier having an input and an output, and connected with its input to said output of said photoelectric converter;

a device for converting said amplified electric pulses into square pulses of a fixed duration and amplitudes equal to the amplitudes of said amplified electric pulses in their middles, said device having an input, a first output and a second output, and being connected with its input to said output of said amplifier;

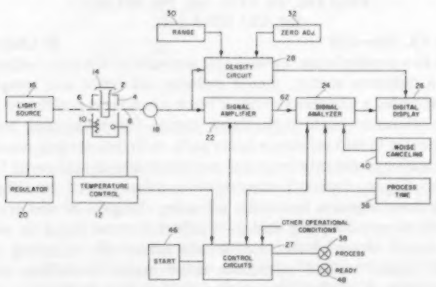
a storage and comparison device having a first input, a second input, a first output, and a second output, and connected with its first input and second input to said first output and second output, respectively, of said device for converting said amplified electric pulses into square pulses of a fixed duration, said storage and comparison device being electrically coupled with its first output to said input of said optical feedback radiation source;

a secondary recording instrument having an input and electrically coupled with its input to said second output of said storage and comparison device, and intended to indicate the temperature of said heated body.

4,176,953
METHOD AND APPARATUS FOR MEASURING THE MOTILITY OF SPERM CELLS

Benjamin Bartoov, Moshav Chemed; Abraham Mayevsky, Bnei Brak; Shmuel Mendel, Givataim, and Amiram Orén, Ramat Aviv, all of Israel, assignors to SEM Israel Limited, Ramat Gan, Israel

Filed May 22, 1978, Ser. No. 908,531
Int. Cl.[2] G01N *21/26, 21/00*
U.S. Cl. 356—73 **16 Claims**

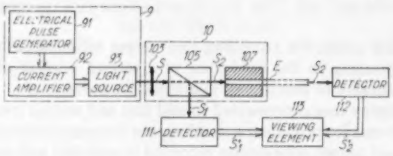


1. A method of measuring the motility of sperm cells, comprising: introducing a suspension of the sperm cells in a transparent container; continuously examining a predetermined field of said suspension to detect the variations in optical density caused by the collective wave-like motion of batches of the sperm cells through said field; generating an amplitude-modulated analog electrical signal in response to said variations in optical density; and counting the peaks and valleys of said amplitude-modulated analog signal over a predetermined period of time to provide an index of sperm motility.

4,176,954
EQUIPMENT FOR MEASURING THE LENGTH OF DIELECTRIC ELEMENTS TRANSMITTING OPTICAL FREQUENCIES

Rémy A. Bouillie, route de Treguier, and Gérard M. Beauvillain, Residence Corlay, both of Lannion, France (22300)

Continuation of Ser. No. 592,166, Jul. 1, 1975, abandoned. This application Feb. 2, 1978, Ser. No. 874,688
Claims priority, application France, Jul. 26, 1974, 74 25995
Int. Cl.[2] G01N *21/00;* **G01B** *11/02*
U.S. Cl. 356—73.1 **1 Claim**



1. Equipment for measurement of propagation time for light waves passing through a dielectric element comprising:

a diode laser source of short periodically repeated bursts of light impulses serving as the light waves passing through said dielectric element;

an adjustable electrical pulse generator for generating an adjustable repetition frequency and a current amplifier connecting said generator to said laser source;

a holder for said dielectric element;

an optical separator interposed along the axis of the laser beam of light emitted by said laser source between said source and said holder which divides the light impulses of said laser beam into a first path of light pulses and a second path of light pulses directed into said dielectric element on said holder;

first detecting means in said first path to receive said light pulses not directed into said dielectric element and convert said light pulses into first electric signals;

optical focusing means interposed along the axis of the laser beam of light between the laser source and said optical separator to direct said light pulses of said second path into the inlet side of said dielectric element;

second detecting means receiving the light pulses which emerge from the output side of said dielectric element after being delayed by passing through the dielectric medium of said element which converts the light pulses into second electrical signals; and

display means for said first and second detecting means for displaying successive pulses of said first electrical signals and successive pulses of said second electrical signals in which light impulses of adjustable repetition frequency achieve visual coincidence on the display of a delayed impulse succeeded by a non-delayed impulse.

4,176,955
EXPOSURE METER

Seiji Yamada, Sakai; Ichiro Yoshiyama, Kobe, and Mashio Kitaura, Tondabayashi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jul. 28, 1977, Ser. No. 820,034
Claims priority, application Japan, Aug. 4, 1976, 51-93416; Aug. 10, 1976, 51-95500
Int. Cl.[2] G01J *1/42;* **G03B** *7/08*
U.S. Cl. 356—222 **22 Claims**

1. An exposure meter comprising:

a luminance detection means for detecting the luminance of

a plurality of portions of an objective scene, and for producing output information corresponding to the luminance of said plurality of portions of said objective scene;

a first memory means connected to said luminance detection means for recording said output information corresponding to the luminance of a first portion of said plurality of portions of said objective scene;

a second memory means connected to said luminance detection means for recording said output information corresponding to the luminance of a second portion of said plurality of portions of said objective scene; and

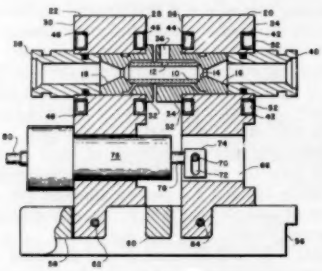
a display means connected to said first and second memory means for providing a simultaneous comparison display of said output information recorded in said first and second memory means for indicating a luminance range defined between the luminances of said first and second portions of said objective scene.

4,176,956

SAMPLE TUBE MOUNTING STRUCTURE FOR FLAMELESS ATOMIC ABSORPTION SPECTROSCOPY

Toma Tomoff, Überlingen, and Rolf G. A. Tamm, Salem, both of Fed. Rep. of Germany, assignors to Bodenseewerk Perkin-Elmer & Co. GmbH, Überlingen, Fed. Rep. of Germany

Filed Mar. 27, 1978, Ser. No. 890,730
Int. Cl.[2] G01J *3/30*
U.S. Cl. 356—312 **11 Claims**



1. In a sample tube mounting structure for flameless atomic absorption spectroscopy, first and second electrode members for supporting the ends of a sample tube and for applying heating current therethrough, first and second cooling jacket housings having coaxial apertures, each for supporting one of the said electrodes, and power actuating means for separating said housings to enable the removal of said sample tube, the improvement comprising:

at least one channel in each of the first and second cooling jacket housings, said channels being in close proximity to the respective electrode supporting aperture; and

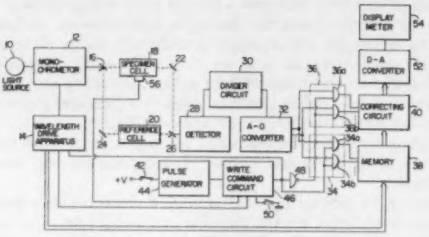
a seamless coolant tubing within each said channel in surface to surface heat transfer contact with the corresponding housing and adapted to carry a flow of cooling liquid to cool the corresponding housing and electrode member carried thereby.

4,176,957

METHOD AND APPARATUS FOR OPTICALLY ANALYZING SPECIMEN BY USING TWO LIGHT BEAMS

Yoshio Maeda; Koichi Matsumoto, both of Katsuta; Kenji Fukuda, Mito, and Isao Shindo, Katsuta, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 17, 1977, Ser. No. 760,130
Claims priority, application Japan, Jan. 30, 1976, 51-8518
Int. Cl.[2] G01J *3/42*
U.S. Cl. 356—319 **10 Claims**



1. A method for optically analyzing a speciment by using two light beams, comprising the steps of automatically initiating a wavelength scanning operation of a monochromator after a power source has been turned on and when a predetermined time required to stabilize the operation of the system has elapsed, sampling a signal representative of the ratio between a specimen light intensity and a reference light intensity in the state in which no specimen to be measured is yet disposed at a measuring position during the period of the wavelength scanning and storing the sampled ratio signal in a volatile memory, obtaining a measure signal representative of ratio between the specimen light intensity and said reference light intensity during the wavelength scanning period by means of said monochromator in the state in which said speciment to be measured is disposed at the measuring position, and correcting and processing said measure signal with the signal read out from said volatile memory in accordance with the wavelength of said measure signal.

4,176,958

AUTOMATIC LOOP GAIN ADJUSTMENT FOR OPTICAL NULL SPECTROPHOTOMETERS

Allan S. Way, Irvine, and Taylor A. Reid, Costa Mesa, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Feb. 24, 1978, Ser. No. 881,082
Int. Cl.[2] G01J *3/42*
U.S. Cl. 356—321 **20 Claims**

1. In a double beam, optical null analyzer of the type including a radiation source, means defining reference and sample beam paths, a variable reference beam attenuator positioned in said reference beam path, drive means for positioning said attenuator in said reference beam path, radiation sensing means responsive to the reference and sample beams in said paths for generating an electrical error signal as a function of the difference therebetween, means for adjusting the gain of said error signal, means coupling said gain adjusted error signal to said attenuator drive means, and means selectively coupling an offset signal to said attenuator drive means to deflect said attenuator, a method for setting said gain adjusting means comprising the steps of:

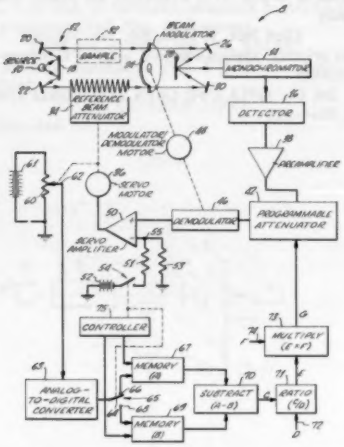
setting said gain adjusting means to a predetermined initial gain setting;

generating a signal as a function of the position of said attenuator;

determining the difference between said position signal with said offset signal coupled to said drive means and said

position signal without said offset signal coupled to said drive means;

determining the ratio of said determined difference to a reference difference, said reference difference being a function of said offset signal;



detemining the product of said ratio and said initial gain setting; and

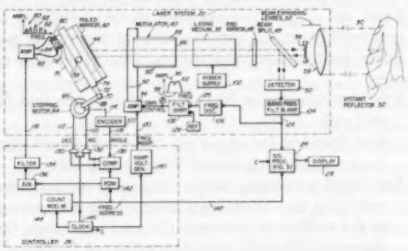
setting the gain of said gain adjusting means to the value of said product.

4,176,959

HIGH GAIN LASER SPECTROMETER

Wayne H. Keene, Medfield; Robert I. Rudko, Holliston, and Charles M. Sonnenschein, Brookline, all of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Apr. 17, 1978, Ser. No. 897,062
Int. Cl.[2] G01J *3/42*; G01N *21/04*
U.S. Cl. 356—325 **13 Claims**



1. A laser spectrometer comprising:

a lasing medium;

first and second reflecting means positioned at opposite ends of said lasing medium, said first reflecting means including interferometer means for selecting a single oscillatory band of a set of oscillatory bands of said lasing medium;

means for directing radiation produced by said lasing medium through a region of space having material to be analyzed, said radiation propagating through said region back to said lasing medium to provide an amplified received radiation signal;

means for altering a frequency of oscillation of said lasing medium prior to the return to said lasing medium of said radiation from said region for maximizing the amplification of said received radiation signal;

means coupled to said first reflecting means to produce a succession of radiations each of which has a specific frequency of oscillation; and

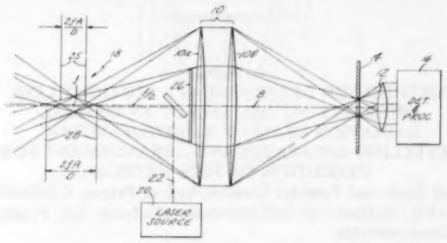
means coupled to said lasing medium for combining data of individual ones of said radiation signals received prior to the entry of said material into said region with data of individual ones of said radiation signals at corresponding frequencies received subsequent to the entry of said material into said region to provide a measure of the concentration of said material.

4,176,960

SPATIAL RESOLUTION ENHANCEMENT IN COAXIAL LIGHT SCATTERING SYSTEMS

Alan C. Eckbreth, Glastonbury, and Jack W. Davis, East Hartford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Continuation-in-part of Ser. No. 624,491, Oct. 21, 1975, abandoned. This application Dec. 9, 1977, Ser. No. 858,937
Int. Cl.[2] G01N *21/22*
U.S. Cl. 356—338 **5 Claims**



1. Coaxial optical apparatus having increased spatial resolution along a desired length L, comprising:

an aperture of diameter A and having an optical axis;

collection means, having a focal length f, disposed on said optical axis on a first side of said aperture and spaced a distance Q therefrom, said collection means collecting light from a sample volume including the image of said aperture spaced along said optical axis a distance P+Q from said aperture and on the opposite side of said collection means therefrom, where $1/f=1/P+1/Q$;

illumination means including a source of radiation for illuminating the sample volume from a point on said optical axis between the sample volume and said collection means in a manner such that backscattering of radiation from the sample volume as result thereof is collected by said collection means;

optically responsive means disposed along said optical axis on a second side of said aperture for detecting and processing backscattered radiation directed from said volume through said aperture by said collection means and

obscuration means consisting of a disk having an effective obscuring diameter equal to $2\ P^2A/QL$ disposed on said optical axis between said aperture and the sample volume for limiting the extent of the sample volume along said optical axis to said desired length L.

4,176,961

METHODS AND APPARATUS FOR IMPROVING THE RESOLUTION OF MEASURED PARAMETERS

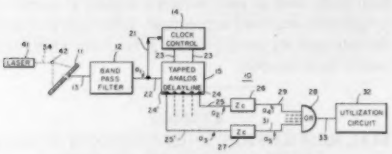
Ralph E. Frazee, Jr., Spotswood Borough, and David H. Smithgall, Sr., East Windsor Township, Mercer County, both of N.J., assignors to Western Electric Co., Inc., New York, N.Y.

Filed Sep. 26, 1977, Ser. No. 836,809
Int. Cl.[2] G01B *9/02*; H03B *19/00*; H03K *5/00*
U.S. Cl. 356—355 **11 Claims**

1. A method of improving the resolution of a measuring system in which the period, T, of a substantially periodic elec-

trical signal is proportional to a measured parameter, the method comprising the steps of:

(a) forming more than two replicas of the periodic electrical signal having a predetermined delay therebetween;



(b) generating a pulse at selected corresponding points of all the replicas of the periodic electrical signal to form a pulse train for each replica; and

(c) interleaving the pulse trains to form a single output pulse train having an interpulse interval that is a fraction of the period T.

4,176,962

METHOD FOR DETERMINING A STRAIGHT LINE INTERSECTING THE AXIS OF AN OPTICAL RADIATION BEAM OF A PHOTOELECTRIC LEVELLING APPARATUS AND ARRANGEMENT FOR EXECUTION OF THIS METHOD

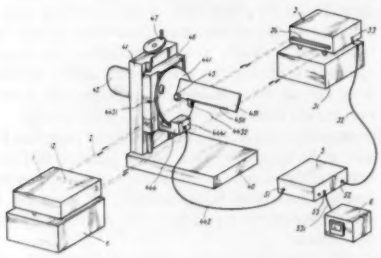
Emil Šípek, and Tomislav Šimeček, both of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Filed Nov. 2, 1977, Ser. No. 847,750

Claims priority, application Czechoslovakia, Nov. 11, 1976, 7273-76; Nov. 11, 1976, 7274-76; Sep. 21, 1977, 6124-77

Int. Cl.[2] G01B *11/26*

U.S. Cl. 356—400 **7 Claims**



1. An optical alignment method, comprising the steps of:

transmitting a light beam along a predetermined path to a photodetector;

eccentrically rotating an opaque member without an alignment axis transverse and adjacent to said path, to alternately intercept said light beam from opposite sides thereof;

sensing when said light beam is about to be intercepted from each side thereof;

providing a first signal indicative of the mean value of light transmitted along said path to said photodetector when the opaque member is on one side of said beam, and providing a second signal indicative of the mean value of light transmitted along said path to said photodetector when the opaque member is on the opposite side of the beam;

providing an output signal corresponding to the difference between said mean values; and

moving said alignment axis until the difference between said mean values is zero.

4,176,963

DEVICE FOR DETERMINING THE NITROGEN OXIDE CONCENTRATION IN A GASEOUS MIXTURE

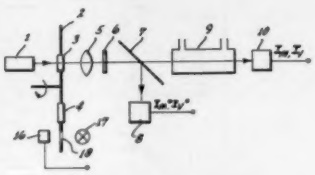
Walter Fabinski, Hattersheim, and Reimar Faulhaber, Frankfurt am Main, both of Fed. Rep. of Germany, assignors to Hartman & Braun AG., Frankfurt am Main, Fed. Rep. of Germany

Filed Nov. 9, 1976, Ser. No. 740,307

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1975, 2553565

Int. Cl.[2] G01J *3/48;* G01N *21/22;* G01J *3/46*

U.S. Cl. 356—418 **5 Claims**



1. An apparatus for determining the nitrogen-oxide concentration in a gaseous mixture;

under utilization of (a) a hollow cathode lamp operated with an oxygen-nitrogen mixture at reduced pressure and at a low discharge current and capable of emitting the nitrogen oxide resonance radiation;

(b) a radiation modulating device for generating/alternatingly an unfiltered beam to be measured and a reference beam;

(c) a nitrogen-oxide filter for filtering said reference beam; and

(d) an absorption cell filled with the gas mixture to be measured and disposed in the path of said reference and said unfiltered beam; the improvement for minimizing measuring errors due to variations in the operation of the lamp comprising:

a monochromator or filter disposed between said filter and said cell;

a first detector for receiving radiation of said alternating beams and having passed through said cell;

first signal processing means connected to said detector for acquiring two alternating detector signals corresponding to the unfiltered beam and the reference beam, both having passed through said absorption cell;

a ray splitter disposed in the path of said beams ahead of said cell to provide a second, different beam path but permitting some radiation to reach the first detector;

a second radiation detector disposed in said additional path;

second signal processing means connected to the second detector for acquiring alternately two detector signals corresponding also to the unfiltered beam and the reference beam but which have not passed the absorption cell; and

third signal processing means connected to said first and second signal processing means for arithmetically combining said four detector signals to obtain a signal indicative of absorption by the absorption cell, under elimination of variations in a ratio between unfiltered and reference beam on account of variations in the operation of said lamp.

4,176,964

DETERMINATION OF EXTREME DENSITY VALUES OF A TRANSPORTED STRIP OF PHOTOGRAPHIC ORIGINALS

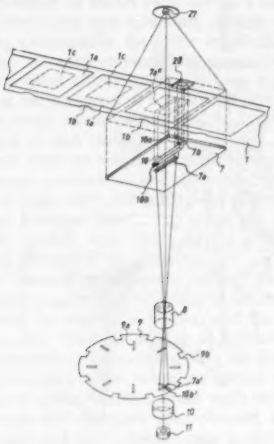
Bernhard Knör; Bernd Payrhammer, and Helmut Treiber, all of Munich, Fed. Rep. of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Fed. Rep. of Germany

Filed Sep. 6, 1977, Ser. No. 830,867

Claims priority, application Fed. Rep. of Germany, Sep. 8, 1976, 2640442

Int. Cl.[2] G01N *21/30*

U.S. Cl. 356—444 7 Claims



1. In an apparatus for determining the extreme density values of successive photographic originals in a strip of photographic originals continuously transported along a predetermined path through a scanning station, in combination, a light source at the scanning station operative for transmitting light through an original located at the scanning station; light-sensing means operative for receiving light transmitted through the original and generating an electrical signal indicative of the intensity of received light; a rotary scanning disk located in the path of light between the light source and the light-sensing means and provided with a plurality of equiangularly distributed radial scanning slots; light-blocking means located in the path of light intermediate the light source and the scanning disk and defining a transverse scanning slot extending transverse to the direction of strip transport; projecting means operative for receiving light transmitted through both the original at the scanning station and the transverse scanning slot and projecting a corresponding slot image onto the surface of the scanning disk, the radial and transverse scanning slots accordingly cooperating during rotation of the scanning disk to define a scanning spot which performs successive line-scan operations each constituted by the movement of one radial scanning slot across the slot image on the surface of the scanning disk, the angular span between adjoining radial scanning slots being greater than the angular span of the slot image projected onto the surface of the scanning disk, thereby establishing interruptions in the transmission of light through the original to the light-sensing means during intermediate time intervals between successive line-scan operations; means operative during the intermediate time intervals for directing onto the light-sensing means reference light from the light source along a reference light path not passing through the strip of originals; and evaluating circuit means receiving both the signal produced by the light-sensing means during the line-scan operations and the signal produced by the light-sensing means during the intermediate time intervals and operative in dependence upon the values of both signals for producing a signal whose value is indicative of the density of the extreme-density scanned spot on the scanned original.

4,176,965

METHOD AND APPARATUS FOR WEIGHING AGGREGATES

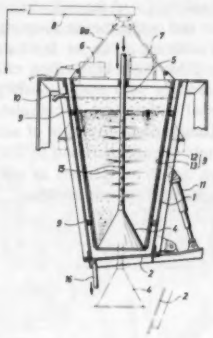
Yasuro Ito; Hideharu Kaga, both of Tokyo; Yasuhiro Yamamoto, Kawasaki; Kenji Kuroha, Tokyo, and Mitsutaka Hayakawa, Kamakura, all of Japan, assignors to Yasuro Ito and Taisei Corporation, both of Tokyo, Japan

Filed Dec. 8, 1977, Ser. No. 858,635

Claims priority, application Japan, Dec. 9, 1976, 51-147180

Int. Cl.[2] B28C *7/04*

U.S. Cl. 366—8 24 Claims



1. A method of preparing aggregate to be utilized to prepare concrete or mortar, comprising the steps of:

loading aggregate in a container;

pouring water into said container to a level to completely immerse said aggregate therein;

weighing aggregate while it is being immersed in said water to determine the volume of the aggregate;

discharging the water from said container; and

removing water remaining in the interstice of said aggregate to adjust said aggregate to at least a capillary state.

4,176,966

MIXING APPARATUS

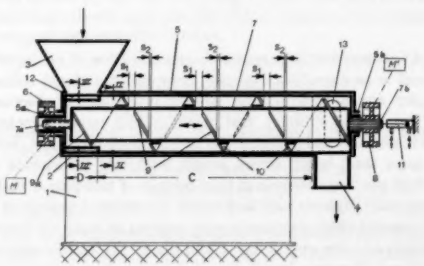
Hans-Joachim Bornemann, Vellmar, Fed. Rep. of Germany, assignor to Thyssen Industrie Aktiengesellschaft, Essen, Fed. Rep. of Germany

Filed Jul. 3, 1978, Ser. No. 921,261

Claims priority, application Fed. Rep. of Germany, Jul. 5, 1977, 2730283

Int. Cl.[2] B01F *15/00*

U.S. Cl. 366—78 5 Claims



1. A mixing apparatus for continuously preparing thermoplastic synthetic material in pulverous to granular form, which apparatus comprises in combination:

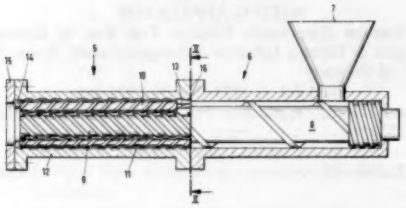
a tubular, rotatable, horizontal container having two ends;
inlet means associated with one of said ends of said container for supplying said material to said container;
outlet means associated with the other one of said ends of said container for the discharge of said material from said container;
a shaft rotatably and concentrically arranged within said container, said shaft extending at least substantially over the entire length of said container and being longitudinally displaceable with respect to said container;
first mixing instruments attached directly to the inner surface of said container and extending radially inwardly up to the outer surface of said shaft; and
second mixing instruments attached directly to said shaft and extending radially outwardly up to the inner surface of said container, said first and second mixing instruments, between said inlet and outlet means, forming a plurality of complementary sections of an at least single-threaded worm particularly having a conveying effect upon said material simultaneously with continuously preparing and mixing the material without any accumulator effect, said sections, in the longitudinal direction of said shaft, being attached alternately to said shaft and to the inner surface of said container, adjacent sections in said longitudinal direction being spaced from one another.

4,176,967

APPARATUS FOR THE PREPARATION OF THERMOPLASTIC MATERIALS

Heinz Brinkmann, Bennigsen, and Horst Spielhoff, Aligse, both of Fed. Rep. of Germany, assignors to Hermann Berstorff Maschinenbau GmbH, Hannover Kleefeld, Fed. Rep. of Germany

Filed Jun. 8, 1978, Ser. No. 913,846
Claims priority, application Fed. Rep. of Germany, Jun. 15, 1977, 2726962
Int. Cl.² B29B *1/10*
U.S. Cl. 366—83 **5 Claims**



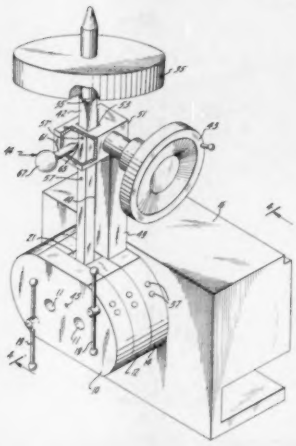
1. Apparatus for the preparation and extrusion of extrudable material in an extruding cylinder comprising a planet rolling extruder and a feed portion having a feed-screw disposed upstream in said cylinder, said planet rolling extruder including a main shaft and planet shafts surrounding said main shaft, said main shaft being driven jointly with said feed-screw of said feed portion, wherein at least certain of said planet shafts at their ends adjacent said feed-screw are reduced in section to form transfer shaft portions having regions of reduced diameter relative to the root circle of said planet shafts, said regions of reduced diameter forming receiving chambers for material fed to said planet rolling extruder by said feed portion, said receiving chambers avoiding excessive feeding of material to said planet shafts thereby avoiding excessive stress on said plant shafts.

4,176,968

THREE SECTIONED MIXER HAVING INDIVIDUAL THERMAL CONTROLS

Heiner M. Kromer, New York, N.Y., and John Ossman, Clifton, N.J., assignors to Haake, Inc., Saddle Brook, N.J.

Continuation-in-part of Ser. No. 713,627, Aug. 11, 1976, abandoned, which is a continuation-in-part of Ser. No. 710,795, Aug. 2, 1976, Pat. No. 4,033,557. This application Jul. 3, 1978, Ser. No. 921,429
Int. Cl.² B29B *1/06*
U.S. Cl. 366—97 **11 Claims**



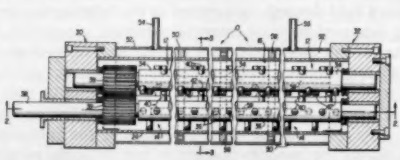
1. An apparatus for preparing and testing material samples, comprising:
a back plate;
a center section having two mixing chambers, each of said mixing chambers having an interior surface with a first angulation sloping down toward said back plate, said center section being releasably secured to said back plate;
a pair of contra-rotating rotors, each rotor having an axial shaft and being axially disposed within one of said mixing chambers, each rotor exhibiting an exterior surface angulation opposite in slope to said first angulation of said mixing chambers; and
a front plate adapted to be releasably secured to said center section,
wherein the counter-rotation of said rotors within said mixing chambers results in the thorough mixing of a flowable sample material within said mixing chambers.

4,176,969

MIXER AND/OR HEAT EXCHANGER DEVICE

Robert A. Wallace, Santa Ana, and J. L. McCurdy, Corona Del Mar, both of Calif., assignors to Polymer Research, Inc., Big Spring, Tex.

Filed Jun. 16, 1978, Ser. No. 916,350
Int. Cl.² B01F *7/04, 15/06*
U.S. Cl. 366—149 **8 Claims**



1. A mixer for thoroughly mixing, without any dead space, a flowable composition comprising

(a) first and second parallel, adjacent mixing chambers having cylindrical inner walls each having a diameter D, said cylindrical walls intersecting along the entire length of the mixing chambers to define a common open channel between the chambers, said open channel lying in a plane extending through the intersections between the circumferences of the inner walls of the chambers and corresponding in width substantially to the chordal distance between said intersections;

first and second rotatable carriers extending axially concentrically through said first and second chambers, respectively, the carriers being supported for synchronized rotation about their axes in opposite directions;

(c) a plurality of blades each having a radial free length L mounted upon and extending radially from each carrier along substantially the entire length of each carrier, the blades on each carrier being sequentially and progressively offset circumferentially from each adjacent blade about the periphery of the carrier and each carrier having a maximum diametrical dimension d where it joins the free length of each blade;

(d) each blade on said first carrier lying in the same radial plane as one blade on said second carrier to form a plurality of blade pairs, the blade pairs intermeshing with each other between the carriers when the carriers are oppositely rotated, each blade having a width m extending along the axis of the chamber;

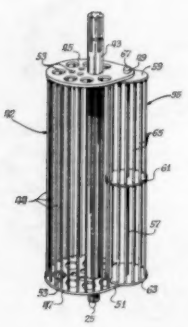
(e) the distance between the axes of the chambers being slightly greater than D minus L, and each assembly of a carrier, its respective blades, and the inner wall of its respective chamber having a dimensional relationship substantially in accordance with the formula: $D=d+2L$, whereby said blades, when in rotation, pass in close proximity to said cylindrical inner walls except when passing through said common open channel, and when passing through said open channel, pass in close proximity to the other carrier; and

(f) inlet and outlet means at opposite ends of the chambers for a composition to be mixed.

4,176,970
DASHER

Philip H. Blaetz, Barrington, Ill., assignor to Kraft, Inc., Glenview, Ill.

Division of Ser. No. 638,291, Dec. 8, 1975, Pat. No. 4,068,832. This application Aug. 29, 1977, Ser. No. 828,512
Int. Cl.[2] B01F 7/02
U.S. Cl. 366--280 **5 Claims**

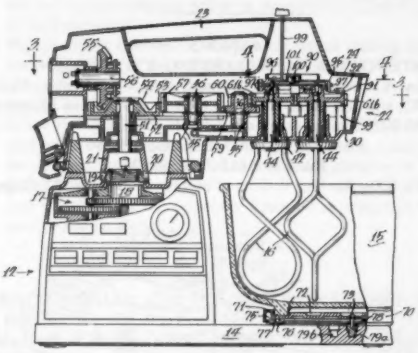


1. In an elongated cylindrical chamber, a dasher for whipping fluid food products passing axially through said chamber, said dasher comprising a drive shaft defining an axis of rotation, a main cage supported on said drive shaft, said main cage comprising a plurality of first frame members spaced axially on said drive shaft and a plurality of first elongated elements supported by said first frame members circumferentially of said drive shaft and extending substantially parallel with each other and with the axis of rotation of said drive shaft, and at least one satellite cage mounted on said main cage for rotation with respect thereto about an axis eccentric to the axis of said drive shaft, said satellite cage including a plurality of spaced second frame members and a plurality of second elongated elements supported by said second frame members and extending substantially parallel with each other and with the axis of rotation of said second satellite cage, said satellite cage being mounted on said main cage such that each of said second elongated elements passes outwardly of an envelope defined by said first elongated elements during rotation of said satellite cage.

4,176,971
MULTI-PURPOSE KITCHEN APPLIANCE

Peter J. Ernster, Glendale; George H. Schaefer, Wauwatosa, both of Wis., and Michael G. Neal, Hixson, Tenn., assignors to Sunbeam Corporation, Chicago, Ill.

Filed Jul. 19, 1978, Ser. No. 925,735
Int. Cl.[2] B01F 7/32
U.S. Cl. 366—298 **13 Claims**



1. In a multi-purpose kitchen appliance, the combination comprising a power unit, a housing enclosing and supporting a gear train which is driven by said power unit, said gear train including reduction gearing driving a pair of output spindles at speeds having a preselected different ratio to each other, said spindles being mounted in said housing for rotation about parallel spaced axes and having implement receiving bores the axis of each of said bores being coincident with said axes of rotation of said spindles, a mixing element insertable into one of said bores for driving connection with one of said spindles, a mixing element insertable into the other of said bores for driving connection with the other of said spindles, means supporting said housing and a bowl with said mixing elements disposed in said bowl for mixing material therein, said mixing elements being spaced around the periphery of said bowl and both being positioned closely adjacent the wall of said bowl for thorough mixing of said material therein.

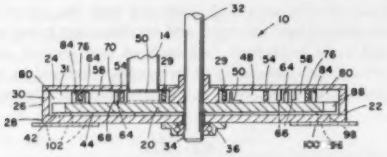
4,176,972
COAXIAL PUMP MIXER

Rodney A. Stiling, Snyder, N.Y., assignor to National Gypsum Company, Dallas, Tex.

Filed Aug. 9, 1978, Ser. No. 932,302
Int. Cl.[2] B01F 7/26
U.S. Cl. 366—304 **9 Claims**

1. A mixer comprising a rotatably mounted substantially flat circular rotor disk, a fixed housing disposed over said rotor disk having a top wall and a radially outwardly disposed annular wall, said rotor disk, said top wall and said annular wall forming a thin, circular hollow chamber within which ingredients to be mixed are centrifugally propelled radially outward,

a liquid inlet opening in said top wall disposed above a radially innermost first circular zone of said rotor disk, a solids inlet opening in said top wall disposed above a second circular zone of said rotor disk which is radially outward of said innermost zone, a radially outermost third circular zone of said rotor disk over which solids and liquids must pass in order to exit from



said chamber, a plurality of centrifugal pump impeller vanes on said disk in said first circular zone, an outlet for mixed liquids and solids in the radially outer periphery of said housing and a plurality of teeth on said disk outer periphery disposed between said hollow chamber and said outlet, whereby said mixed liquids and solids must pass between the rotating teeth to get to the said outlet.

4,176,973

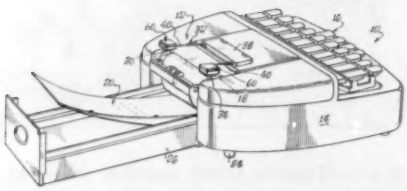
STENOTYPE TAPE MARKING ATTACHMENT

Stephen A. Gregory, 13532 Wynant Dr., Westminster, Calif. 92683, and Joseph A. Welzen, 11338 Barbi La., Los Alamitos, Calif. 90720

Filed Jul. 29, 1977, Ser. No. 820,256

Int. Cl.[2] B41J *3/26, 29/00*

U.S. Cl. 400—91 **21 Claims**



1. A tape marking attachment for a stenotype machine comprising:

a mounting base for attachment to the machine,

a marking pad,

a resilient spring wire arm means carrying said marking pad spaced from the mounting base, and

means hingedly supporting the resilient arm means on the base with the pad in an upward retracted position,

said arm means comprising a resiliently flexible arm which bends in response to light manual downward pressure on said marking pad into an extended downward marking position.

4,176,974

INTERACTIVE VIDEO DISPLAY AND EDITING OF TEXT IN THE ARABIC SCRIPT

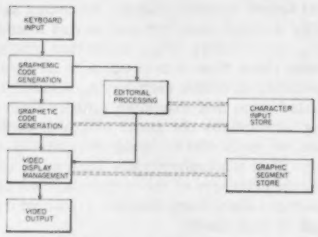
Wilson B. Bishai, Stoneham, and John H. McCloskey, Cambridge, both of Mass., assignors to Middle East Software Corporation, Cambridge, Mass.

Filed Mar. 13, 1978, Ser. No. 886,276

Int. Cl.[2] B41J *0/00*

U.S. Cl. 400—111 **3 Claims**

2. A system for mechanical reproduction of Arabic-script letters in a highly acceptable esthetic manner conforming to the traditional norms and conventions of that script, specifically in the matter of producing cursive output, comprising in combination: a keyboard having a key for the basic form of each of the Arabic letters in the Arabic alphabet, a first storage means associated with said keyboard for storing upon activation of any key, a graphemically coded representation of the basic letter corresponding to said key, means for converting said graphemic representation into a fuller graphetic coded representation wherein the context-conditioned graphic variation of Arabic letters is recognized, a second storage device containing the appropriate digitized graphic output element or elements corresponding to each of the graphetic coded repre-



sentations, a video medium, and means for progressively and continuously displaying each new output element on said video medium including means for modifying as necessary all previously displayed output elements to conform them to a state of calligraphic correctness on the assumption that the new output element is terminal and means for then displaying said new output element on said medium as though it were terminal.

4,176,975

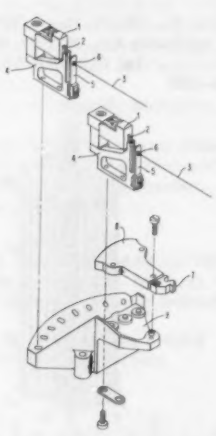
METALLOID FILAMENT WIRE MATRIX PRINT HEAD

Wentzle R. DeBoskey, and Robert A. Sebrosky, both of Raleigh, N.C., assignors to International Business Corporation, Armonk, N.Y.

Filed Dec. 5, 1977, Ser. No. 857,627

Int. Cl.[2] B41J *3/10;* **C01B** *35/02, 31/04*

U.S. Cl. 400—124 **3 Claims**



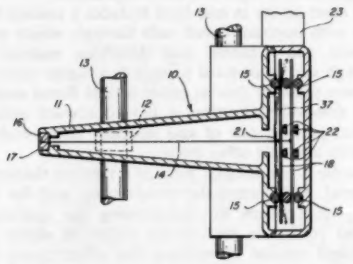
1. An improved dot matrix printer apparatus having at least one print wire means for impacting a medium to form a mark, at least one electromagnetic print wire driver operably connected with said print wire means for axially reciprocating the same to impact said medium wherein said improvement comprises:

said print wire means being at least one continuous unitary filament of elemental metalloid material boron.

4,176,976
MOSAIC PRINTING HEAD

Josef Lendl, Ottensoos, Fed. Rep. of Germany, assignor to Triumph Werke Nurnberg A.G., Nuremberg, Fed. Rep. of Germany

Filed Mar. 16, 1978, Ser. No. 887,023
Claims priority, application Fed. Rep. of Germany, Apr. 15, 1977, 2716618
Int. Cl.[2] B41J *3/12;* H01L *41/04*
U.S. Cl. 400—124 **5 Claims**

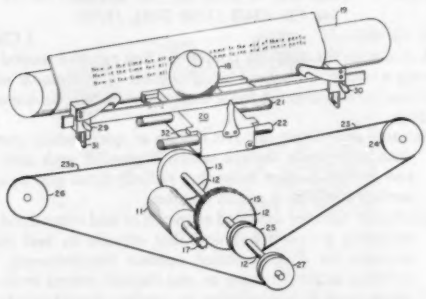


1. In a mosaic printing head for use in forming a printed pattern on a record carrier, the combination comprising:
a housing having a bore in a first end thereof,
a plurality of elongated strip shaped piezoelectric driving elements mounted in a second end of said housing, said piezoelectric driving elements exhibiting flexure upon application of an excitation signal thereto,
mounting means for said driving elements, said mounting means being fixed relative to said housing and contacting said elements on spaced nodal points thereof, and
an array of printing members supported in said housing and extending from said first end to said second end, each of said printing members being attached to a middle portion of one of said driving elements between the spaced nodal points thereof.

4,176,977
PROPORTIONAL CARRIER CONTROL AND MOVING MECHANISM FOR ELECTRIC TYPEWRITER

Francis H. Shepard, Jr., Summit, N.J., assignor to Realty & Industrial Corporation, Morristown, N.J.

Filed Mar. 8, 1978, Ser. No. 884,560
Int. Cl.[2] B41J *19/58*
U.S. Cl. 400—320 **9 Claims**



1. A carrier control arrangement for an electric typewriter having a printing element mounted on a linearly movable carrier the movement of which is proportional to the angle of rotation of a carrier drive shaft, the direction of said movement corresponding to the direction of rotation of said drive shaft, said arrangement comprising:
an encoding disk rotationally coupled to said drive shaft;
first and second stationary pulse generating sensors coupled to said disk for generating first and second pulses corresponding to predetermined incremental rotational movements of said disk, each of said pulses having a given duty cycle when said carrier moves at a constant velocity;
a logic circuit responsive to said pulses for generating third and fourth control pulses corresponding to predetermined clockwise and counterclockwise incremental rotational movements of said disk respectively;
a distributor circuit responsive to said third and fourth pulses and to carrier stepping pulses for generating a first directional count pulse for each one of said stepping pulses provided thereto and for each one of said control pulses provided thereto corresponding to a direction of rotation of said shaft to advance said carrier in a given direction, said distributor circuit generating a second directional count pulse for each one of said control pulses provided thereto corresponding to a direction of rotation of said shaft to return said carrier in the opposite direction;
a bidirectional digital counter for counting in one direction in response to said first directional count pulses and counting in the opposite direction in response to said second directional count pulses, the output of said counter being set to a predetermined value in response to a carrier returned signal;
a digital-analog converter for generating an analog signal corresponding to the output of said counter;
an amplifier for generating a motor drive signal in response to said analog signal; and
a motor for rotating said drive shaft and disk in response to said motor drive signal, so that said carrier is caused to move a predetermined incremental linear distance in said given direction in response to each of said stepping pulses, and to return in the opposite direction in response to a carrier return signal.

4,176,978
PENCIL SHEATH AND COMPOSITION THEREFOR

Jan Ružicka, No. 630 Marxova; Jindřich Lorenz, No. 678 Sidliste, both of Kralupy n/Vlt.; Vladimir Marek, No. 3 Komenskeho, and Miroslav Tusl, No. 10 Komenskeho, both of Ceske Budejovice, all of Czechoslovakia

Continuation-in-part of Ser. No. 871,947, Jan. 24, 1978, abandoned. This application Jan. 9, 1979, Ser. No. 2,104
Claims priority, application Czechoslovakia, Jan. 26, 1977, 51588/77
Int. Cl.[2] C08J *9/06*
U.S. Cl. 401—96 **4 Claims**

1. A composition, particularly adapted for sheaths of graphite and similar rods in the manufacture of pencils, comprising in combination:
100 parts of polyvinylaromatic plastic,
1 to 9.5 parts of polyethylene,
a component selected from group A consisting of the following compounds:

A	{	1 to 30 parts of polypropylene, 1 to 30 parts of polyvinylchloride, 1 to 30 parts of polyvinylacetate,

1 to 30 parts of a combination of at least two of said compounds of group A,
1 to 20 parts of talc,
5 to 50 parts of glass fibers,
0.3 to 2.0 parts of a foaming agent with a decomposition temperature between 170° and 240° C., and
a component selected from group B consisting of the following compounds:

B	{	0.3 to 2.0 parts by weight of a foaming agent with a decomposition temperature between 100 and 160° C., 1 to 20 parts by weight of foamable polymer of

-continued

anethylenic unsaturated monomer.

said 1 to 20 parts by weight of foamable polymer of an ethylenic unsaturated monomer containing from 0.3 to 2.0 parts by weight of a foaming agent with a decomposition temperature between 100° and 160° C.,

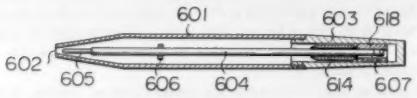
all parts being weight.

4,176,979

BALL-POINT PEN

Yasushi Saida, 20-24, Tsurumaki 5-chome, Setagaya-ku, Tokyo, Japan (154)

Filed Oct. 31, 1977, Ser. No. 846,825
Int. Cl.[2] B43K *7/12, 24/04, 21/04*
U.S. Cl. 401—100 **1 Claim**



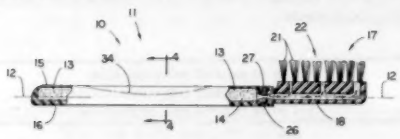
1. A ball-point pen comprising an ink tube having a ball-point at one end, a lid of a magnetizable material at the other end and a projection intermediate said ends, an outer case for housing therein said ink tube and comprising a holder part and a cap part, a weight slidably mounted on the outer surface of the ink tube, a tubular magnet carried by said outer case and defining at an end thereof nearest the ball-point a generally radial step for engaging said lid of the ink tube when said ball-point is extended out of an opening of the holder part to exert mechanical and magnetic locking forces on said lid to hold said ball-point in the extended position, said tubular magnet receiving said lid therein when said ball-point is retracted inside the holder for magnetically attracting and holding said lid to retain the ball-point in the retracted position, said weight being slidable toward said lid when the pen is inverted to release said lid from engagement with said step.

4,176,980

DISPOSABLE TOOTHBRUSH AND DENTIFRICE COMBINATION

Chester L. O'Neal, 101 S. Locust, Greencastle, Ind. 46135, and Danny C. O'Neal, 1652 Lorraine Dr., Corona, Calif. 91720

Filed Dec. 2, 1977, Ser. No. 857,008
Int. Cl.[2] A46B *11/02*
U.S. Cl. 401—162 **3 Claims**



1. A disposable toothbrush dentifrice combination comprising:

(a) an elongated handle having a central axis and an elongated cavity offset from the central axis therein, the offset cavity containing an amount of dentifrice material and defining a thin-walled portion and a thick-walled portion in said handle, said thick-walled portion located closer to said axis than said thin-walled portion;

(b) a head having an inner elongated cavity through which said axis extends and a plurality of bristles defining a brushing surface thereon, said head further including a plurality of outlet openings in the brushing surface connected to the inner cavity therein;

(c) means for attaching said head to said handle and for connecting the inner cavity in said head with the offset cavity in said handle; and wherein:

(d) said thin-walled portion in said handle is movable toward said thick-walled portion along the entire length of said handle to force the dentifrice material into the cavity in said head and out through the outlet openings in the brushing surface, the thick-walled portion in said handle being generally rigid and not compressible;

(e) the inner cavity in said head includes a constricted passage with opposite flared ends through which said axis extends and wherein said dentifrice material flows through said constricted passage at a higher velocity and a lower pressure than at either of said flared ends when said thin-walled portion is moved toward said thick-walled portion, one of said opposite flared ends opens directly into said offset cavity;

said handle is one integral piece of a resilient thermoplastic material, said means for compressing and for forcing comprising means for compressing the resilient thin-walled portion in said handle within its elastic limit a sufficient amount to collapse the offset cavity in said handle, and said handle includes air intake means for allowing air to flow into the offset cavity in said handle after the thin-walled portion thereof has been compressed;

said air intake means includes an aperture through which said axis extends with said aperture in said handle opening into the offset cavity therein; and an inner flap hingedly attached inside the cavity and positioned to cover the inner opening of said aperture, said hinged flap being responsive to close said aperture when the resilient thin-walled portion in said handle is compressed, said hinged flap being responsive to open said aperture and allow air to enter the offset cavity after the compressing and while the resilient thin-walled portion returns to its original configuration;

the outlet openings in the brushing surface on said head vary in size, the outlet openings nearer said handle being increasingly smaller than the openings more distant therefrom.

4,176,981

DEVICE FOR COUPLING A PAIR OF RODS

Robert L. Clapper, Pittsburgh, Pa.; E. Frederick Schoneweis, Kearny, Nebr.; Andrew Hankosky, and Earl A. Bake, both of Pittsburgh, Pa., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Filed Mar. 6, 1978, Ser. No. 884,088
Int. Cl.[2] F16B *37/00;* **F16L** *15/00*
U.S. Cl. 403—31 **2 Claims**

1. A device for operably coupling a first rod to a second rod having a common axis and being capable of movement along said axis for transmitting force therebetween, said device comprising:

an extension of said first rod having an intermediate portion with an exterior surface which is parallel with said axis and an end portion extending radially from said exterior surface to define a piston member;

a cylinder member mounted at an end of said second rod and including a cylindrical wall that extends by said piston member for sliding, sealed contact therebetween, said cylinder member having an end thereof remote from said second rod which includes an opening therethrough;

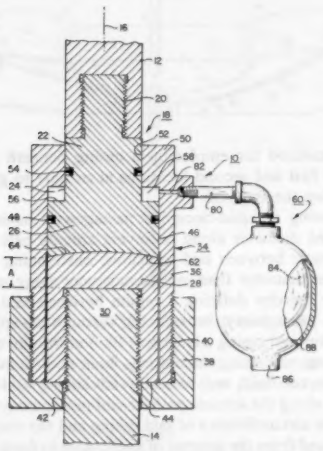
said intermediate portion of said extension being received within said opening for sliding, sealed contact between said exterior surface and an interior surface of said opening;

said extension of said first rod and said cylinder member having mating surfaces thereon transverse to said axis for engagement therebetween to establish a maximum axial distance between said first rod and said second rod;

a chamber within said cylinder member defined by said cylindrical wall, said end of said cylinder member, said exterior surface and a first side of said piston member;

said piston member having a second side capable of engaging a contacting surface on structure within the cylinder member located at a predetermined distance from said end of said second rod to establish a minimum axial distance between said first rod and said second rod;

an accumulator connected to said cylinder member with an interior thereof communicating with said chamber;



said accumulator including gas at a precharged pressure acting on hydraulic fluid therein which said fluid communicates with and fills said chamber; and

said hydraulic fluid in said chamber biasing said first rod toward said second rod and limiting tensile force being transmitted from said first rod to said second rod when a relative distance therebetween is less than said maximum axial distance and greater than said minimum axial distance.

4,176,982

BICYCLE PATH TRANSPORT SYSTEM

James W. Boswell, 9610 Deering Ave., Livonia, Mich. 48150

Filed Oct. 31, 1977, Ser. No. 847,405

Int. Cl.[2] E01C *5/00*

U.S. Cl. 404—34 **8 Claims**

1. A bicycle path transport system of indefinite length mounted on a berm or similar supporting surface, comprising a plurality of pairs of flexible rails connected end-to-end and supported in spaced parallel relationship on said berm or similar supporting surface, each rail having a groove extending longitudinally of the rail in the inner side wall thereof facing the opposite parallel rail, a plurality of flexible runners connected end-to-end and extending lengthwise in the space between said pairs of rails to provide a smooth continuous surface therebetween for bicycle travel, the outer edges of said runners being retained in the grooves of the adjacent rails so that the runners span the space between the parallel rails, said rails and said runners being flexible to a degree sufficient to allow flexing of the rails and runners to accommodate contours in the berm or similar supporting surface, certain of said runners being curved in a horizontal plane to provide curves in the path when initially installing the system, and shim members positioned between said rails and the berm or similar supporting surface for supporting said rails at desired elevations so that the runners can be curved to either side, sloped up or down and tilted at any angle on the supporting surface.

4,176,983

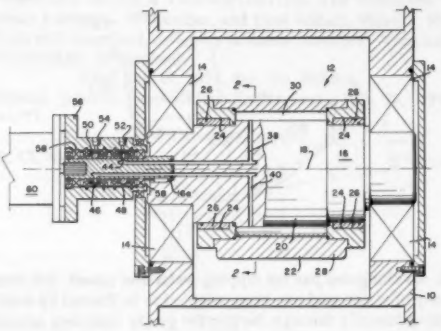
VARIABLE ECCENTRIC DEVICE

James F. Gardner, Cranbury, N.J., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Jul. 17, 1978, Ser. No. 924,921

Int. Cl.[2] E01L *19/38*

U.S. Cl. 404—117 **14 Claims**



4. A variable eccentric device, for a vibratory mechanism for an earth compactor, or other device, comprising:

first means defining a shaft having a rotary axis;

said shaft having a mass which is eccentric to said axis;

second means defining an annular sleeve in envelopment of said mass and an axial portion of said shaft;

said sleeve having a weighted portion which is eccentric to said axis;

said shaft and said sleeve being coupled together for relative rotary motion thereof between a first relative positioning, in which said mass and said weighted portion are juxtaposed in radial alignment, and a second relative positioning, in which said mass and said weighted portion are diametrically opposed; and

means coupled to one of said first and second means operative for effecting said relative rotary motion of said shaft and said sleeve; wherein

said motion-effecting means comprises means for addressing motive, pressured fluid to a sleeve-enveloped surface of said shaft and to a shaft-enveloping surface of said sleeve;

said shaft has a rib projecting radially therefrom which rotatably and slidably engages said surface of said sleeve;

said sleeve has a rib projecting radially therefrom which rotatably and slidably engages said surface of said shaft;

said ribs are substantially closed upon each other during said second relative positioning of said shaft and said sleeve,

and substantially diametrically opposite each other during said first relative positioning of said shaft and said sleeve;

said fluid-addressing means comprises means for introducing pressured fluid between said ribs to cause said ribs to close upon, and move apart from, each other;

said eccentric mass is defined by a radial sector of said shaft which, relative to said rotary axis, comprises a greatest radius;

said shaft rib projects from the midpoint of said sector; and

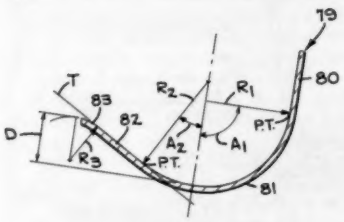
said fluid-addressing means includes a first fluid conduit formed in said shaft and opening, at one end thereof, through a first port formed in a surface of said shaft in immediate adjacency to said shaft rib.

4,176,984

FISH HOLDING PAN ON TRAVELING WATER SCREEN AND METHOD OF FLUSHING SAME

Richard J. Sommers, New Britain, Pa., assignor to FMC Corporation, San Jose, Calif.

Filed Sep. 26, 1977, Ser. No. 836,929
Int. Cl.[2] F02B *8/08*
U.S. Cl. 405—81 **5 Claims**



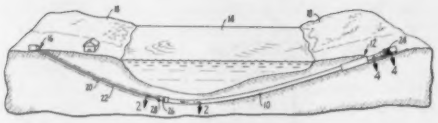
1. An elongated pan for dipping water and aquatic life from a body of water, said pan being adapted to be flushed by water flowing laterally through the pan for gently removing aquatic life therefrom, said pan having a curved bottom portion with inner and outer sides projecting upwardly therefrom and a discharge lip located at the top of the outer side, said discharge lip extending horizontally in a direction lengthwise of the pan to provide a uniform level over which water is discharged from the pan, said pan having a smoothly curved interior surface profile taken on a transverse section through the pan with the inner and outer sides being tangential to the curved bottom portion, said outer side and said discharge lip having an upward and outward inclination that does not exceed the slope of an extended tangent line from the point of tangency between the outer side and the curved bottom portion, whereby spray water directed against the inner side is deflected downward to flow smoothly about the curved bottom portion and then to flow upward and outward over the outer side and the discharge lip without any further transitional increase in slope, said pan interior surface profile on a transverse section across the discharge lip being curved from the outer side in a direction reverse to the curved bottom portion, said pan interior surface profile on a transverse section across the curved bottom portion being defined by compound curves having arcs totaling 120°, said curved bottom portion being defined by a first curve section that is tangent to the inner side, said first curve section having a radius of 2 inches with a central angle of 90°; and a second curve section continuing from the first curve section, said second curve section having a radius of 2½ inches with a central angle of 30°.

4,176,985

SYSTEM AND METHOD FOR INSTALLING PRODUCTION CASINGS

Martin D. Cherrington, Carmichael, Calif., assignor to Reading and Bates Construction Co., Houston, Tex.

Continuation-in-part of Ser. No. 595,830, Jul. 14, 1975, Pat. No. 4,043,136. This application Nov. 10, 1976, Ser. No. 740,570
Int. Cl.[2] F16L *1/04*
U.S. Cl. 405—184 **7 Claims**



1. A method for emplacing a casing beneath an obstacle between first and second locations at or near to ground level comprising the steps of:

excavating a liquid-occupied passageway having a preselected diameter along an invert arcuate path under said obstacle between said locations; introducing a casing of lesser diameter than said passageway along said passageway thereby defining a region between said casing and said passageway; introducing through a supply conduit within said casing a transport fluid at the site of said excavating; entraining the cuttings from said excavating in the transport fluid; non-rotatably advancing said casing into and along the arcuate path of said passageway; sealing the outer circumference of said casing and the circumscribing ground from the interior of said casing to form a sealed-off annulus; withdrawing said transport fluid and entrained cuttings from the site of said excavating to prevent said cuttings from settling in the ground circumscribing the advancing casing; causing said transport fluid and entrained cuttings to flow through a return conduit within said casing; sealing off the interior of said casing proximate the site of said excavating to provide buoyancy to the casing within the passageway; and selecting the weight and size of said supply and return conduits passing through the interior of said casing so that the weight of said conduits and their respective contents substantially neutralizes said buoyancy to minimize friction between the casing and the sidewalls of the passageway to facilitate advancement of said casing into the passageway.

4,176,986

SUBSEA RISER AND FLOTATION MEANS THEREFOR

Daniel G. Taft, and Joe K. Heilhecker, both of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.

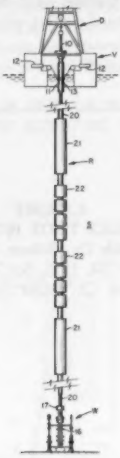
Filed Nov. 3, 1977, Ser. No. 848,170
Int. Cl.[2] E21B *7/12*
U.S. Cl. 405—211 **22 Claims**

1. A buoyancy can for use on a self-standing riser at subsea depths having a slip joint in the upper portion thereof, said buoyancy can comprising:

(a) a housing defining a buoyancy chamber adapted to receive a compressed gas, said housing having a port formed in an upper portion thereof providing fluid communication between said buoyancy chamber and the exterior of said housing, said port having a flow area of sufficient size to enable venting of compressed gas from said chamber upon disconnection of said riser before the buoyancy of said can extends said slip joint to its upper limit;

(b) a fail-safe valve member positioned within said housing, said valve member having a biasing means to bias said valve to a first position wherein said port is open and said valve being movable to a second position wherein said port is closed, said valve member in the open position

permitting the equalization of pressure between said chamber and ambient pressure opposite said port; and



(c) a closing means capable of moving said valve to said second position, said closing means becoming inoperable upon disconnection of said riser to enable said biasing means to move said valve to said first position.

4,176,987

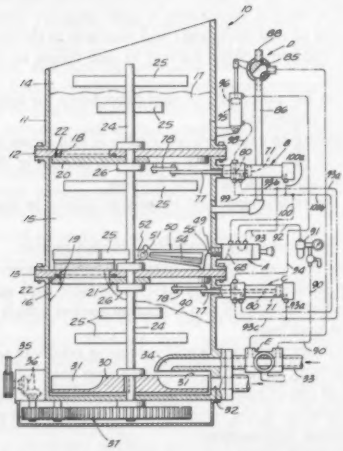
FLUENT MATERIAL HANDLING APPARATUS

Frank A. Reed, deceased, late of South El Monte, Calif., and by Paul M. Diemert, executor, 23 Woodsbluff Run, Fogelsville, Pa. 18051, assignors to Paul M. Diemert, Fogelsville, Pa.

Filed Mar. 13, 1978, Ser. No. 885,621

Int. Cl.² B65G *53/40*

U.S. Cl. 406—10 **22 Claims**



1. Pneumatically operated fluent material feeding apparatus comprising:

(a) first, second and third chambers arranged in a vertical stack and separated from one another by first and second pneumatically operable valves said first chamber being uppermost and vented to the atmosphere and said second and third chambers including means normally maintaining the same charged with pressurized air;

(b) said third chamber being lowermost and equipped with pneumatically powered means for discharging a pressurized stream of fluent material and air therefrom;

(c) non-electrical fluent material level sensing means in said second chamber;

(d) normally closed pneumatically-operable air vent means for said second chamber; and

(e) pressurized air flow control means responsive to said level sensing means when the material in said second chamber reaches a predetermined low level to close said second valve, interrupt the supply of pressurized air to said second chamber, open said air vent means and open said first valve in predetermined order and in out-of-phase sequence thereby to recharge said second chamber with fluent material from said first chamber while continuing to discharge a pressurized stream of fluent material and air from said third chamber.

4,176,988

APPARATUS FOR SEPARATING OPENED FIBRE FLOCKS FROM A TRANSPORTING AIR STREAM

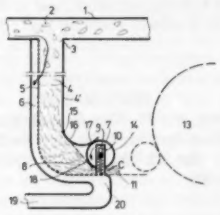
Werner Lattmann, Winterthur, and Paul Stäheli, Wilen b. Wil, both of Switzerland, assignors to Rieter Machine Works Ltd., Winterthur, Switzerland

Filed Jul. 10, 1978, Ser. No. 922,815

Claims priority, application Switzerland, Jul. 18, 1977, 8849/77

Int. Cl.² B65G *53/60*

U.S. Cl. 406—171 **6 Claims**



1. An apparatus for separating opened fibre flocks from a transporting air-stream, moving through a transporting duct, comprising:

at least one chute operatively connected with the transporting duct;

an exhaust duct cooperating with said chute;

said chute being provided with at least one air-permeable separating wall for guiding transporting air into said exhaust duct;

said chute having a lower end region;

a driven take-off device arranged at said lower end region of said chute comprising a take-off roll arranged facing said air-permeable separating wall and leaving free a small cross-section through which pass the deposited fibres;

said take-off device forming a fibre layer by compressing said deposited fibres between said take-off roll and said air-permeable separating wall;

said exhaust duct extending at least into a zone of smallest clearance between the take-off roll and said air-permeable separating wall;

said chute containing a further wall; and

means for sealing the take-off roll with respect to said further wall.

4,176,989

AUXILIARY DEVICE FOR BORING OF DOWEL HOLES IN BOARDS

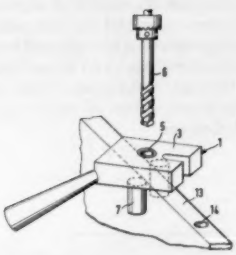
Robert Wolff, im Kiesacker, Engeln, Fed. Rep. of Germany

Filed Aug. 17, 1978, Ser. No. 934,411

Claims priority, application Fed. Rep. of Germany, Nov. 14, 1977, 2750868; Feb. 27, 1978, 2808277

Int. Cl.[2] B23B *49/02, 47/28*

U.S. Cl. 408—115 R 9 Claims



1. An auxiliary device for the boring of dowel holes in boards that are to be doweled together comprising:

a flat plate having a centrally located guide hole lined by means of a bore bushing for receiving a boring tool;

said plate provided on one of its flat sides with two round projecting vertical pegs which are disposed diametrically opposite to and at equal distances from said guide hole;

the space between said vertically projecting pegs forming a dowel scanning part having a flat board contacting surface lying on the surface of said plate;

an elongated slit at a front edge of said plate having an inside width equal to that of the guide hole; and

said slit having longitudinal walls which lie in two planes which are oriented both in parallel to one axial plane of said guide hole and perpendicular to the board-contacting surface of the dowel scanning part.

4,176,990

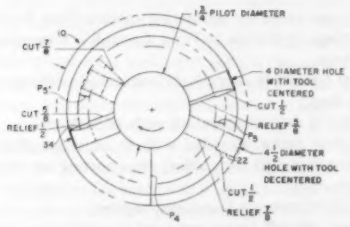
BORING TOOL

Russell D. Gover, Sr., 97 Wise Ave., Baltimore, Md. 21212

Filed Apr. 14, 1978, Ser. No. 896,483

Int. Cl.[2] B23B *51/00, 29/034*

U.S. Cl. 408—189 7 Claims



1. In a boring tool rotatable by a holder about an axis of rotation, the boring tool having a substantially flat bottom with an outboard cutting edge and an inboard cutting edge having asymmetrical spacings along a portion of said substantially flat bottom for cutting respectively contiguous paths in work to be bored, the improvement comprising: in combination: the boring tool being elongate transverse to said axis of rotation, the axis of rotation passing through the boring tool between the ends thereof, the outboard cutting edge and the inboard cutting edge being respectively on opposite ends of the boring tool relative to said axis of rotation, the asymmetrical spacing including the outboard cutting edge having greater spacing from said axis of rotation than the inboard cutting edge spacing, and the inboard cutting edge having a length which is greater than the outboard cutting edge length.

4,176,991

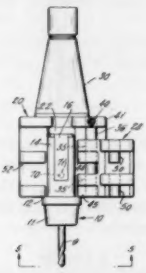
HINGED TOOL HOLDER

Henry O. Egli, Riverside Dr., Sidney, N.Y. 13838

Filed Mar. 23, 1978, Ser. No. 889,234

Int. Cl.[2] B23B *31/10*

U.S. Cl. 408—239 R 2 Claims



1. In a machine having an operating spindle, a clamp carried by said spindle for supporting a tool co-axially with said spindle;

said clamp having a main body secured to said spindle;

a recess in said main body co-axial with said spindle;

said main body having one section defining said recess and another section comprising a gate hingedly mounted on one side of said main body and rotatable at the side of said main body in a plane normal to said recess to close said recess;

means on the other side of said main body for locking said gate in place; and

a tool having an extension receivable in said recess by movement of said extension in a direction normal to the axis of said recess when said gate is open;

means for positioning said extension axially in said recess; and

means for securing said extension in said recess;

said means for securing said extension in said recess comprising a lock screw in said gate extendable into said recess and a flat section on said extension against which said lock screw may bear;

the means for positioning said extension axially in said recess comprising a member extending into said recess from a wall of one of said extension and recess and a corresponding opening in the other of said extension and recess for receiving said member;

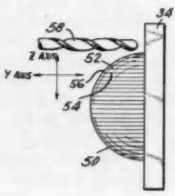
said hinged mounting of said gate comprising a pin carried by said main body parallel to the axis of said recess; said gate having a plurality of openings rotatable and slidable on said pin; and

the side of the gate opposite said hinged mounting having a plurality of pins extending parallel to the axis of said recess and the corresponding side of the housing having a plurality of openings adapted to slidably receive said pins on movement of said gate in a direction parallel to the axis of said recess and to lock said gate.

4,176,992
NUMERICALLY CONTROLLED MILLING WITH PARABOLIC PROFILE TOOLS FOR SURFACE SMOOTHNESS

Joseph A. Ross, Fort Salonga, and Howard K. Stern, Greenlawn, both of N.Y., assignors to Solid Photography Inc., Melville, N.Y.

Filed May 31, 1977, Ser. No. 801,818
Int. Cl.[2] B23C *1/00, 5/02*
U.S. Cl. 409—131 1 Claim

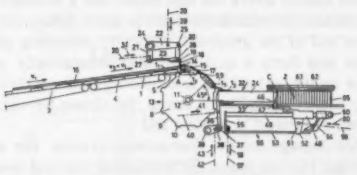


1. A method for machining a surface comprising the steps of: establishing points within a first plane on said surface; establishing points within at least a second plane on said surface, said second plane being parallel to said first plane and spaced therefrom by an increment; establishing the desired slopes to be machined on said surface between said planes; positioning a cutting tool with a predetermined cutting surface against said surface so that the periphery of the tool in contact with said surface has substantially the same slope as said desired slope to be machined; applying relative displacement in increments between said cutting tool and material to be machined to remove surface material between said planes with a preselected part of the cutting tool corresponding to the desired slope at each point; and moving thereafter said tool perpendicular to said plane by a predetermined increment corresponding substantially to said space for further machining the surface within a space between said second plane and a third parallel plane using parts of the cutting tool with slopes corresponding to the desired slopes on said surface between said second and third planes; said cutting tool storing cutting surfaces with varied slopes, said slopes being selectable to substantially conform to said desired slope to be machined, said tool being selectively positioned for locating the cutting surface conforming to the desired slope against the surface to be machined within said increment between said planes; said slopes extending over an area dependent in size on the displacement increments of the tool in movement between said planes and dependent on the displacement increments perpendicular to said planes and wherein said steps of applying relative displacement and moving said tool by a predetermined increment are repeated for machining a surface of predetermined size, said cutting tool having a parabolic profile, said profile being comprised of straight-line cutting surfaces interconnected to form said parabolic profile, the slopes on said cutting tool varying in value from zero to infinity, said cutting tool having an axis of rotation and a free end, said cutting tool having cutting edges with slopes varying in value from substantially infinity at said free end of said tool to zero at a predetermined distance along said axis of rotation from the end of said tool, said tool and said material being displaced with respect to a reference position for applying said relative displacement between said cutting tool and said material to be machined.

4,176,993
APPARATUS FOR FORMING STACKS OF FLAT OBJECTS

Pierre Luginbühl, Neuhausen am Rheinfall, Switzerland, assignor to S I G Schweizerische Industrie-Gesellschaft, Neuhausen am Rheinfall, Switzerland

Filed Feb. 8, 1978, Ser. No. 876,148
Claims priority, application Switzerland, Feb. 11, 1977, 1697/77
Int. Cl.[2] B65G *57/00*
U.S. Cl. 414—106 8 Claims



8. In apparatus for forming stacks of flat objects, including a toothed wheel to which juxtaposed objects are fed while traveling on an at least approximately horizontal input path, and between the teeth of which the objects are accommodated and are then moved to the area of a stacking station by way of rotation of the toothed wheel, the improvement wherein said toothed wheel is composed of two toothed discs spaced apart along the axis of said wheel and each provided with circumferentially spaced teeth defining object retaining pockets between successive teeth, a given spacing existing between successive pockets along the circumference of said wheel, and said apparatus further comprises plunger means operatively associated with said wheel for pushing each object arriving at the end of the input path into a respective pocket when such pocket is situated at the top of said toothed wheel and for braking the next following object on the input path to synchronize the introduction of objects with the rotation of said wheel, said wheel being driven in continuous rotation and objects being supplied continuously thereto during operation of said apparatus, and wherein said plunger means include a member having an L-shaped profile composed of an at least approximately horizontal arm for injecting each object into a respective pocket, and an at least approximately vertical arm, said member being movable in a manner such that the corner point of said profile traverses a complete cycle of a path defined by a closed curve during each rotation of said wheel by an amount equal to the given spacing between successive pockets, while the leading narrow side of the object following that being injected into a pocket abuts on the face of the vertical arm of said member.

4,176,994
COKE OVEN CHARGING APPARATUS

William H. Sangster, Collinsville, Ill., assignor to National Steel Corporation, Pittsburgh, Pa.

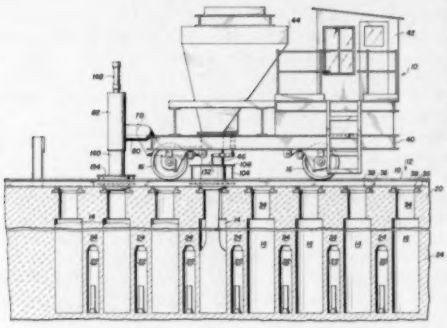
Filed Jan. 30, 1978, Ser. No. 873,365
Int. Cl.[2] B66C *17/08;* C10B *31/04*
U.S. Cl. 414—163 36 Claims

1. Coupling means comprising,
a generally vertically extending pipe having an open bottom end,
a generally horizontal wall spaced below the open bottom end of the pipe,
an opening in the generally horizontal wall, said opening having a circular top peripheral rim portion,
seal means having an open center and including an annular upwardly directed substantially planar surface, and a downwardly and inwardly inclined substantially spherical annular sealing surface for engaging and making sealing contact with said top peripheral rim,
elongated substantially cylindrical sleeve means for cooper-

ating with said seal means to establish a closed communication path between said open bottom end of the generally vertically extending pipe and said opening in the generally horizontal wall, said sleeve having an open bottom end disposed in a plane extending at right angles to the longitudinal axis of the sleeve and adapted to engage the upwardly directed planar surface of the seal means around its full periphery to form a seal with said upwardly directed planar surface,

mounting means supporting the sleeve means for coaxial telescoping movement along the pipe between a raised position spaced above the seal means and a lowered position in which its open bottom end projects below the open bottom end of the generally vertically extending pipe to engage and form a seal with said substantially planar surface on the seal means, said mounting means including power means operable to move the sleeve between the lowered and raised positions, and

collapsible linkage means connected between the sleeve means and the seal means for supporting the seal means in suspended coaxial relation with and spaced beneath the



open bottom end of the sleeve means and with the spherical sealing surface spaced above the generally horizontal wall when the sleeve means is in the raised position, the collapsible linkage means permitting limited lateral movement of the seal means relative to the sleeve means, the length of the collapsible linkage means and the extent of movement of the sleeve means between the raised and lowered positions being such that, when the sleeve means is moved from the raised to the lowered position, the spherical sealing surface engages said top peripheral rim portion of the opening in the generally horizontal wall before the sleeve means reaches the lowered position with the linkage means thereafter collapsing to permit further downward movement of the sleeve means to the lowered position in which the open bottom end of the sleeve means rests upon and forms a substantially gas-tight seal with the upwardly directed planar surface of the seal means around the full periphery of the sleeve means despite limited axial misalignment between the sleeve means and the seal means and despite limited displacement of said circular top peripheral rim portion from the horizontal.

4,176,995

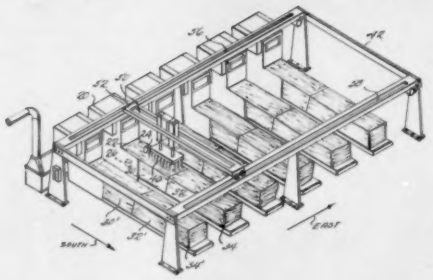
AUTOMATIC PICKUP AND UNLOADING CRANE

Cecil S. Wise, Dallas, N.C., assignor to Fiber Controls Corporation, Gastonia, N.C.

Continuation of Ser. No. 615,092, Sep. 19, 1975, abandoned, which is a continuation of Ser. No. 526,919, Nov. 25, 1974, abandoned, which is a continuation of Ser. No. 295,356, Oct. 5, 1972, abandoned. This application Nov. 30, 1976, Ser. No. 746,014

Int. Cl.[2] **B65G** *47/00;* **B66C** *17/00*

U.S. Cl. 414—266 **6 Claims**



1. In a control circuit for operating an overhead crane mounted on a frame for movement vertically and in horizontal directions to pick up material from one of a number of sources, transport that material and permit it to drop onto one of a number of given locations from which the material is removed, there being at each said location means for sensing the level of material at each of said locations and providing a demand signal when that level is less than a predetermined level, the improvement in means for automatically causing said crane to move to supply material to each of said locations having a sensing means providing a demand signal so that each location is supplied with material from a plurality of sources, comprising:

a plurality of electric motors including a north motor for moving the crane in a first horizontal direction, a south motor for moving the crane in a second horizontal direction opposite to said first direction, an east motor for moving the crane in a third horizontal direction transverse to said first and second directions, a west motor for moving the crane in a fourth direction opposite to said third direction, an up motor for raising said crane, a down motor for lowering said crane, a close motor for causing a quantity of said material to be picked up and an open motor for causing a quantity of said material to be released

west means connected to said sensing means for completing a current path through said west motor whenever any one of said sensing means is producing a demand signal so that said crane is moved in said fourth direction, and for interrupting the current path through said west motor when said crane is in line with a given location having a sensing means producing a demand signal,

means for completing a current path through said north motor when said current path through said west motor is interrupted so that said crane moves in said first direction,

indicating means having an output condition indicating from which source material is to be picked up,

north means for interrupting the current path through said north motor when said crane is over the source indicated by said indicating means and completing a current path through said down motor,

down sensing means for sensing when said crane has moved down to a position for picking up material and providing a down signal,

down means connected to said down sensing means for interrupting the current path through said down motor when said down sensing means provides said down signal,

and for completing a current path through said close motor,

close means for interrupting the current path through said close motor when said material is held and completing a current path through said up motor,

up means for interrupting the current path through said up motor when said crane is up and completing a current path through said south motor so that said crane moves in said second direction,

south means for interrupting the current path through said south motor when said crane is over the given location and completing a current path through said open motor,

open means for interrupting the current path through said open motor after the picked material has fallen at the given location,

first recycle means for recompleting a current path through said north motor to repeat the above until said indicating means indicates enough material has been picked up from said indicated source for said given location and released by said open means at said given location,

second recycle means for recompleting a current path through said west motor to cause said crane to move in said fourth direction until said crane is in line with another given location having a sensing means producing a demand signal, and

east means for completing a current path through said east motor to cause said crane to move in said third direction, when said crane has moved past all of said given locations, back to the initial position,

wherein said west means includes:

a plurality of normally open sensing switches connected in parallel and serially with said west motor, each switch being respectively associated with a sensing means and shifting to a closed position when the associated sensing means is producing a demand signal,

a normally open east limit switch serially connected with said plurality of sensing switches,

a west relay connected to said west motor having first and second controlled switches,

a second plurality of serially connected sensing switches which are each normally closed and respectively associated with a sensing means and shifting to an open position when the associated sensing means is producing a demand signal, and

a plurality of normally closed serially connected position switches connected in parallel with said second plurality of serially connected sensing switches and opening respectively when the crane is in line with an associated given location,

said west motor being connected in series with said first controlled switch and therethrough to said second plurality of sensing switches.

4,176,996

AUTOMATIC POSITIONING SYSTEM FOR A CARRIAGE IN A STORAGE AND RETRIEVAL SYSTEM

Nobuyuki Oku, Osaka, Japan, assignor to Itoki Kosakusho Co., Ltd., Osaka, Japan

Filed Dec. 29, 1977, Ser. No. 865,694

Claims priority, application Japan, Dec. 29, 1976, 51-159639

Int. Cl.[2] B65G *1/04*

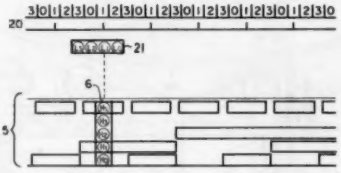
U.S. Cl. 414—273 **8 Claims**

1. An automatic positioning system for a commodity carriage in an automatic storage system, comprising, shelves arranged to have commodity storage positions extending in the vertical and horizontal direction,

a commodity carriage adopted to move up and down and right and left along a front face of the shelves,

vertical position code marks and horizontal position code marks identifying said storage positions, said code marks arranged within the movable range of the carriage, a code scanning device included within the carriage for reading said position code marks,

a control circuit responsive to an output of said code scanning devices for controlling the operation of the carriage and for stopping the carriage at a position facing a designated storage position, said position code marks identifying N storage positions in either the vertical or horizontal direction as one group of storage spaces, wherein N is a natural number larger than 1 but much less than the total number of storage positions extending in either the vertical or horizontal direction, each group of N storage spaces including a reference mark at a predetermined position within the N storage spaces,



N mark scanning devices for detecting the N marks are installed on the carriage to correspond to N spaces of storing positions face to face, the detecting circuit is built into the above-mentioned first control circuit to detect which one of the N pieces of mark detective devices has output, and the feature controlling the movement of the carriage to receive output from the mark detective device corresponding to the designated storing position.

4,176,997

BULK-STORAGE RECEPTACLE WITH HELICAL CHUTE

Paul Hungerbach, Essen-Bredeney, Fed. Rep. of Germany, assignor to Thyssen Schachtbau GmbH, Muhlheim, Fed. Rep. of Germany

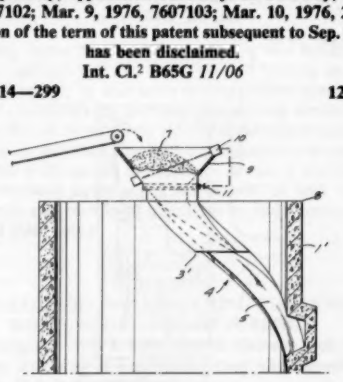
Division of Ser. No. 775,403, Mar. 7, 1977. This application Dec. 19, 1977, Ser. No. 862,125

Claims priority, application Fed. Rep. of Germany, Mar. 9, 1976, 7607102; Mar. 9, 1976, 7607103; Mar. 10, 1976, 2609797

The portion of the term of this patent subsequent to Sep. 5, 1995, has been disclaimed.

Int. Cl.[2] B65G *11/06*

U.S. Cl. 414—299 **12 Claims**



1. A bulk-storage receptacle comprising:

a structure formed with an upright wall defining a storage chamber for flowable bulk material;

means forming a helical chute opening toward said chamber and spiraling downwardly along said wall, said helical chute having a ramp receiving said material and extending generally transversely to said wall while being formed with a first tangential inclination and a first radial inclination; and

means for feeding bulk material to said helical chute, said wall and said chute being constituted of panels mounted in mutually contiguous relationship, each of said panels having an elastic inner layer, an adhesive layer applied to

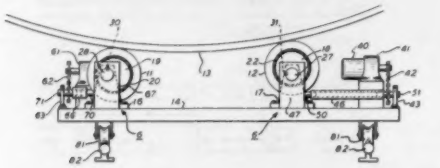
said inner layer for anchoring the panels to said wall and a wear-resistant outer layer adapted to define the chamber for receiving said material.

4,176,998

FIT-UP TURNING ROLL SYSTEM

John H. Wittenrich, Freedom, N.Y., assignor to Airco, Inc., Montvale, N.J.

Filed Feb. 21, 1978, Ser. No. 878,838
Int. Cl.[2] B65G 7/00
U.S. Cl. 414—433 **6 Claims**



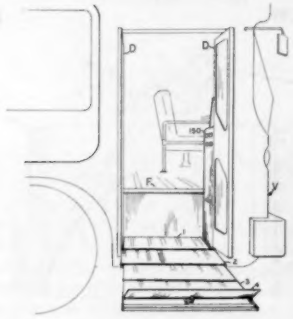
1. In apparatus for positioning a first substantially cylindrical workpiece in alignment with a second workpiece, comprising: a base, at least two substantially parallel idler rolls and corresponding shafts being mounted upon the base for supporting said first workpiece, the improvement which comprises means for mounting each roll for free rotation about an eccentric axis of the corresponding shaft, and motor means for individually rotating each said shaft to cause the axis of the corresponding roll to be rotated about the axis of the shaft to enable horizontal and vertical repositioning of said first workpiece.

4,176,999

WHEELCHAIR LIFT

Graham R. Thorley, San Diego, Calif., assignor to Transportation, Design & Technology, Inc., San Diego, Calif.

Continuation-in-part of Ser. No. 769,636, Feb. 2, 1977, Pat. No. 4,081,091. This application Mar. 13, 1978, Ser. No. 885,714
Int. Cl.[2] B60P 1/46
U.S. Cl. 414—540 **8 Claims**



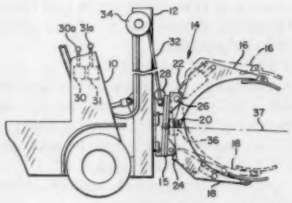
1. In the doorway of a vehicle, a wheelchair lift which in its slowed position forms the normal entrance steps comprising:
a multisectional load carrying platform which comprises:
at least three continguous sections
means for articulately connecting each section to at least one other section
means for moving the platform between ground level and vehicle floor level;
means for rotating at least one section to a substantially vertical position, and for placing at least one other section continguous to said rotatable section into a substantially horizontal position whereby said vertically and horizontally positioned sections form a step structure,
wherein one of said sections comprises:
a first flat element forming substantially one half of said section, having its edge nearest to the center of said section and parallel to other sections slidingly interlocking with a second flat element;
the second flat element forming substantially the second half of said section, having an edge slidingly interlocking with said edge of the first flat element; and
means for slidingly moving the first flat element in a common plane and in relation to the second flat element, whereby the width of the section is modified.

4,177,000

ROTATABLE LOAD CLAMP ADAPTED FOR SELECTIVE LOAD POSITIONING IN RESPONSE TO SELECTIVE ROTATIONAL POSITIONING OF CLAMP

Harry F. Weinert, Portland; Larry D. McCart, Lake Oswego, and David J. Weisgerber, Gresham, all of Oreg., assignors to Cascade Corporation, Portland, Oreg.

Filed Mar. 22, 1978, Ser. No. 888,925
Int. Cl.[2] B66C 1/42
U.S. Cl. 414—620 **3 Claims**



1. A load-handling clamp adapted to be mounted upon the lifting apparatus at the forward end of a lift truck for engaging a load, comprising:
(a) a frame adapted to be mounted upon said lifting apparatus so as to be selectively movable vertically by said lifting apparatus;
(b) rotating means for rotating said frame with respect to said lifting apparatus about a generally forwardly-extending axis of rotation;
(c) first and second selectively openable and closeable opposing clamp arms mounted upon said frame projecting therefrom in a forward direction, each of said clamp arms having a forward end and a rear end respectively;
(d) powered mounting means movably connected said clamp arms to one another and to said frame including a first fluid motor for selectively opening and closing said clamp arms and a second fluid motor for selectively moving said clamp arms in unison generally perpendicular to said axis of rotation between a position of equal extension, wherein the forward ends of said clamp arms are spaced apart from one another by a predetermined distance and extend a substantially equal distance forwardly of said frame, and a position of unequal extension wherein the forward ends of said clamp arms are spaced apart from one another by said predetermined distance and the forward end of one clamp arm extends a greater distance forwardly of said frame than the forward end of the other clamp arm, said powered mounting means including rotation-responsive fluid valve means responsive to the rotational position of said frame and operatively connected to said first and second fluid motors respectively for permitting the selective operation of said first fluid motor while simultaneously preventing the operation of said second fluid motor at a first rotational position of said frame where said clamp arms are substantially one above the other and at a second rotational position of said frame where said clamp arms are substantially side-by-side horizontally and, alterna-

tively, permitting selective operation of said second fluid motor while simultaneously preventing the operation of said first fluid motor at intermediate rotational positions of said frame which are between said first and second rotational positions; and

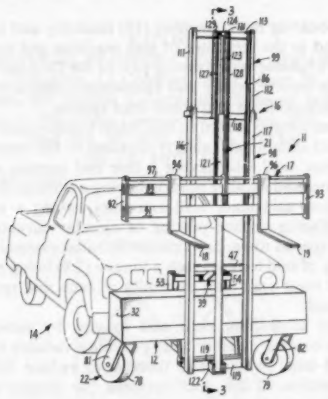
(e) a fluid line interconnecting said first fluid motor with said rotation-responsive fluid valve means for conducting fluid to said first motor tending to open said clamp arms, and pilot-operated valve means connected to said first fluid motor for sensing pressure in said fluid line and preventing the opening of said clamp arms whenever the pressure of fluid in said fluid line is below a predetermined pressure, further including bypass means interconnecting said fluid line with said rotation-responsive fluid valve means for relieving the pressure of fluid in said fluid line, as sensed by said pilot-operated valve means, so as to prevent said pressure from reaching said predetermined pressure whenever said frame is in one of said intermediate rotational positions and for preventing the relief of the pressure of fluid in said fluid line through said bypass means whenever said frame is in either said first or second rotational position.

4,177,001

FORKLIFT ATTACHMENT FOR HIGHWAY VEHICLES

William A. Blackwood, 2966 Boeing Rd., Shingle Springs, Calif. 95682

Filed Aug. 5, 1977, Ser. No. 822,193
Int. Cl.[2] B66F *9/20*
U.S. Cl. 414—628 **27 Claims**



1. A forklift attachment for lifting and transporting cargo with highway vehicles, comprising

a frame,

attachment means adapted for connecting said frame to the front end of a road vehicle for movement therewith,

a vertically telescoping mast carried upright on said frame,

fork means mounted for upward and downward movement along said upright mast and having forwardly projecting cargo support members,

power means for effecting said upward and downward movement of said fork means,

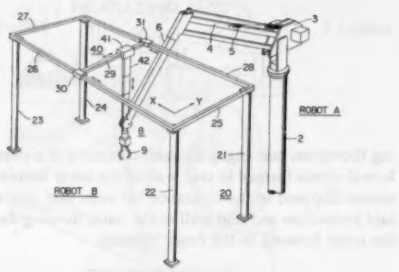
and wheel means mounted on said frame and formed for supporting the weight of said frame and fork means and cargo supported on said members during both lifting and transport.

4,177,002

COOPERATIVE DRIVE ROBOT

Kenro Motoda, Tokyo, and Kensuke Hasegawa, Yokohama, both of Japan, assignors to Motoda Denshi Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 16, 1978, Ser. No. 888,148
Claims priority, application Japan, Jun. 8, 1977, 52/67592; Jun. 13, 1977, 52/69677; Dec. 8, 1977, 52/147665
Int. Cl.[2] B25J *3/00*; B66C *23/00*
U.S. Cl. 414—751 **9 Claims**



1. A cooperative drive robot arrangement for moving a load to a desired position, said robot arrangement comprising:

a main robot including a load holding section, means for actively moving said holding section in opposite substantially rectilinear directions, and means for enabling said moving means to be passively moved in directions parallel to a plane transverse to said rectilinear directions, said main robot being free of means for actively moving said moving means or said holding section in directions parallel to said plane;

at least one sub robot including a guide device within said plane, and a drive device mounted on said guide device for active movement therealong in directions within said plane, said drive device being prevented from movement relative to said guide device in said rectilinear directions; and

connecting means for flexibly connecting said holding section to said drive device such that said holding section is actively moved by said drive device in directions parallel to said plane, thereby enabling said moving means of said main robot to be passively moved in directions parallel to said plane, and such that said holding section is passively movable with respect to said drive device in said rectilinear directions upon active movement of said holding section in said rectilinear directions by said moving means of said main robot.

4,177,003

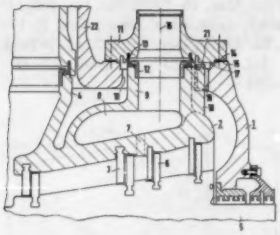
INSTALLATION FOR CENTERING THE INNER HOUSING OF A STEAM TURBINE

Axel Remberg, and Willi Triesch, both of Mülheim, Fed. Rep. of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mülheim, Fed. Rep. of Germany

Filed Aug. 8, 1977, Ser. No. 822,797
Claims priority, application Fed. Rep. of Germany, Aug. 10, 1976, 2635980
Int. Cl.[2] F01D *25/26*
U.S. Cl. 415—108 **4 Claims**

1. Installation for centering, in an outer housing, an inner housing of a steam turbine having an extraction interstage comprising a tubular shaped portion formed on the inner housing and communicating with the extraction interstage, the outer housing having a wall formed with a passageway wherein said tubular shaped portion is received, an extraction connecting pipe disposed on the outer housing over said passageway thereof, said extraction connecting pipe having sealing surfaces engaging with corresponding sealing surfaces

formed on said wall of the outer housing, the mutually engaging sealing surfaces being disposed eccentrically to said passageway and to said tubular shaped portion, said tubular shaped portion having a projection with lateral flanks extending therefrom and engaging with clearance in a corresponding lateral recess formed in said wall of the outer housing, and key means disposed in the clearance between said lateral flanks of said projection and said wall of the outer housing for centering the inner housing in the outer housing.

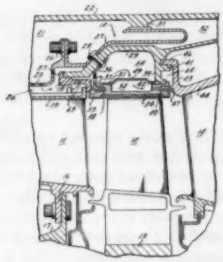


4,177,004

COMBINED TURBINE SHROUD AND VANE SUPPORT STRUCTURE

Charles F. Riedmiller, Greenhills, and Melvin Bobo, Cincinnati, both of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Oct. 31, 1977, Ser. No. 846,958
Int. Cl.[2] F02C *7/12, 7/20*
U.S. Cl. 415—116 **8 Claims**



1. In a turbomachine support structure of the type extending radially inward to provide radial support for the forward end of a turbine shroud and axial support for a vane outer band, an improved support arrangement comprising:

(a) a shroud for placement in close radial relationship with a row of turbine blades;

(b) a shroud support segment interconnecting said shroud and a surrounding support element, said support element having a forward flange extending independently forward from the point where said shroud support segment connects to said shroud support element;

(c) a ring disposed between the vane outer band and said support element, said ring comprising an axial leg with its front end abutting said forward flange and a radial leg integrally attached to and extending radially inward from the rear end of said axial leg to frictionally engage and provide axial support to the vane outer band; and

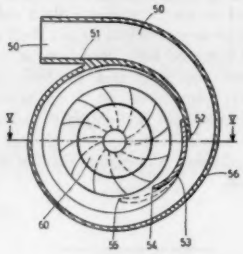
(d) means for introducing cooling air in the space partially defined by said ring and said shroud segment wherein said means comprises a plurality of circumferentially spaced holes formed in said ring for conducting the flow of cooling air therethrough.

4,177,005

VARIABLE-THROAT SPIRAL DUCT SYSTEM FOR ROTARY STREAM-FLOW MACHINES

Hans-Günther Bozung, Neusäss-Westheim, and Hans Mendle, Augsburg, both of Fed. Rep. of Germany, assignors to Maschinenfabrik Augsburg-Nürnberg Aktiengesellschaft (M.A.N.), Augsburg, Fed. Rep. of Germany

Continuation of Ser. No. 720,735, Sep. 7, 1976, abandoned. This application Jul. 19, 1978, Ser. No. 926,021
Claims priority, application Fed. Rep. of Germany, Sep. 6, 1975, 2539711
Int. Cl.[2] F01D *9/00, 17/12*
U.S. Cl. 415—128 **5 Claims**



1. A variable-throat spiral duct system for a stream-flow machine in which shaft motion is coupled to flow of a gas or liquid, comprising:

a machine having an axial shaft and a rotor carrying thereon means for engaging a flow medium;

at least one spiral duct leading spirally inwards to said rotor and having a radially outer wall and also a radially inner wall of less circumferential length than said radially outer wall;

a tongue-bearing insert member (**11**) rotatably and coaxially mounted in the structure of said machine and formed as part of a tubular pipe forming part of the flow path of said medium on the axially and functionally opposite side of said machine from said spiral duct system;

at least one tongue affixed to said insert member and thereby mounted slidably and snugly adjacent to the extremity of said inner wall and having a free end portion of spiral curvature and another portion having a surface of circular curvature, said inner wall extremity having a matching inwardfacing surface portion of circular curvature, and being tapered towards its circumferential extremity in the vicinity of said tongue, such a tongue (**7,8**) being provided for the inner wall (**5,6**) extremity of each said spiral duct (**1,2**), and

means for so shifting each said tongue, by moving said tongue-bearing member, as to provide a variable extension of said inner wall(s) and thereby to reduce the throat cross-section of the duct between the tongue and said radially outer wall of the duct.

4,177,006

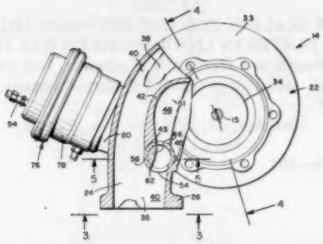
TURBOCHARGER CONTROL

James H. Nancarrow, Torrance, Calif., assignor to The Garrett Corporation, Los Angeles, Calif.

Filed Sep. 29, 1977, Ser. No. 837,799
Int. Cl.[2] F01D *17/14, 17/18*
U.S. Cl. 415—151 **36 Claims**

1. A turbocharger comprising a compressor; and a fluid driven turbine drivingly coupled to said compressor, said turbine including a turbine housing having a fluid inlet portion and a generally scroll-shaped portion, a radially inwardly extending meridonal septum dividing said inlet and scroll-shaped portions into a pair of axially displaced primary fluid flow paths, wall means formed integrally with said turbine housing for closing a portion of the radially inner boundary of

said primary paths and for defining a radially inwardly open secondary flow path in communication with said primary paths, and valve means disposed along the secondary flow path



and controllably movable between a first position opening said secondary path to allow fluid flow through both said primary and secondary paths, and a second position substantially closing said secondary path to fluid flow.

4,177,007

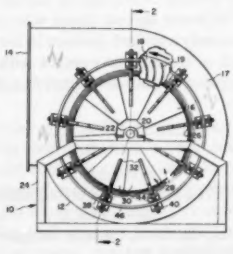
CENTRIFUGAL BLOWER CONTROL APPARATUS

Andrew J. Schlangen, La Crescent, Minn.; Jerry W. McClead, La Crosse, and Thomas A. Garavalia, Stoddard, both of Wis., assignors to The Trane Company, La Crosse, Wis.

Filed Jan. 25, 1978, Ser. No. 872,136

Int. Cl.[2] F01D *17/14*

U.S. Cl. 415—160 **25 Claims**



1. A centrifugal blower apparatus including a centrifugal blower housing having an outlet opening and a side wall having an inlet opening; a centrifugal blower wheel disposed in said housing and mounted for rotation about an axis extending axially outwardly through said inlet opening; a plurality of radially outwardly extending inlet guide vanes disposed about said axis at said inlet opening each having a radially outer edge; and pivot means, including a pivot at each of said vanes, for pivotally adjusting a major portion of each of said vanes between a fully closed position disposed in an area axially inwardly of said side wall and a fully open position disposed axially outwardly of said side wall.

4,177,008

CENTRIFUGAL PUMP

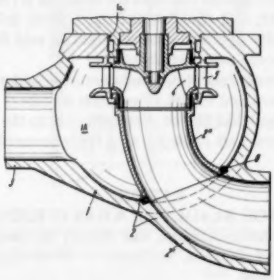
Dusan Florjancic, Winterthur, Switzerland, and Heinz-Bernd Matthias, Frankenthal, Fed. Rep. of Germany, assignors to Klein, Schanzlin & Becker Aktiengesellschaft, Frankenthal, Fed. Rep. of Germany

Continuation of Ser. No. 622,017, Oct. 14, 1975, abandoned, which is a continuation-in-part of Ser. No. 436,689, Jan. 25, 1974, abandoned. This application Jan. 4, 1978, Ser. No. 866,933

Claims priority, application Fed. Rep. of Germany, Jan. 26, 1973, 2303718

Int. Cl.[2] F04D *29/42*

U.S. Cl. 415—206 **9 Claims**



1. In a centrifugal pump, particularly in a primary recirculating pump for use in pressurized water and boiling water nuclear reactors, a combination comprising a substantially spherical hollow pump housing having a sealable opening; an impeller rotatable in said housing; an inlet having an outer section which is rigid with said housing and inclined with respect to the axis of said impeller and which has a discharge port for inflowing fluid, and a discrete inner section installed in said housing to receive inflowing fluid from said discharge port of said outer section and to convey the fluid into the range of said impeller, said inner section comprising a plurality of axially adjacent communicating tubular portions, said impeller and said inner section of said inlet being removable from said housing by way of said opening; and an outlet for conveying pressurized fluid from said housing, the plane of said discharge port of said outer section of said inlet being at least closely adjacent to said outlet.

4,177,009

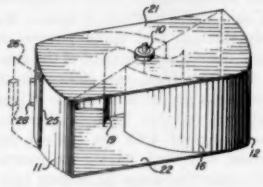
ROTOR ASSEMBLY

Joseph W. Baum, Sr., Rte. #1, Box 250, Scottsdale, Ariz. 85257, and Dave A. Timothy, 2340 E. University Dr., Tempe, Ariz. 85281

Continuation of Ser. No. 749,771, Dec. 13, 1976, abandoned. This application Apr. 5, 1978, Ser. No. 893,800

Int. Cl.[2] F03D *3/02, 7/06*

U.S. Cl. 416—45 **12 Claims**



1. A rotor assembly including in combination:

a rotatable shaft;

first and second curved side rotor plate members each formed as a section of a cylinder having a radius R1, said

plate members each being concentrically located a distance R1 from the axis of said shaft on diametrically opposite sides of said rotatable shaft, each of said first and second rotor plate members having first and second edges parallel to said shaft;

third and fourth rotor plate members each formed as identical concave elongated sections and each attached respectively to the diametrically opposite first edges of said first and second rotor plate members at a distance R1 from the axis of said shaft to form discontinuities of curvature in the form of apexes along the lines of attachments thereof, said third and fourth rotor plate members curving toward said shaft and terminating in respective edges thereof parallel to said shaft, spaced less than the distance R1 from the axis of said shaft, and equidistant from a plane defined by the diametrically opposite second edges of said first and second side rotor plate members; and

first and second end plate members attached to said first, second, third and fourth rotor plate members and located in spaced parallel planes perpendicular to the axis of said shaft to form end walls for said rotor assembly.

4,177,010

COOLED ROTOR BLADE FOR A GAS TURBINE ENGINE

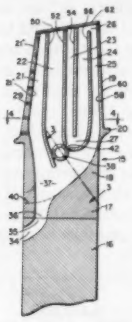
Terence M. Greaves, Kilburn, and Robert D. Summers, Long Eaton, both of England, assignors to Rolls-Royce Limited, London, England

Filed Mar. 22, 1978, Ser. No. 888,972

Claims priority, application United Kingdom, Jan. 4, 1977, 13808/77

Int. Cl.[2] F01D *5/18*

U.S. Cl. 416—97 R **6 Claims**



1. A cooled rotor blade for a gas turbine engine comprising:

an integrally cast hollow aerofoil portion, hollow shank portion, and root portion, said aerofoil portion having a leading edge, a trailing edge, and convex and concave flanks, said aerofoil portion further having a plurality of chordal-spaced and spanwise partitions extending between the convex and concave flanks from adjacent its tip portion and terminating in and/or adjacent the hollow interior of said shank portion, a hollow bush extending transversely through said shank portion and having at least one end open to the exterior of the shank portion for receiving a cooling fluid, said hollow bush engaging at least two adjacent partitions to define at least one cooling passage separate from at least another cooling passage which communicates with the hollow interior of said shank portion, said bush having an aperture in its wall opening to a space between the at least two partitions for supplying cooling fluid to the said at least one cooling passage, and a cooling fluid entry aperture in at least one of said root portion and said shank portion communicating with the hollow interior of said shank portion, said last-mentioned cooling fluid entry aperture supplying cooling fluid to the hollow interior of said shank portion and then to the said at least another cooling passage.

4,177,011

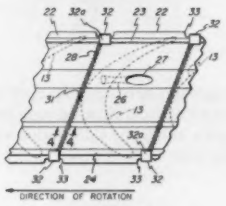
BAR FOR SEALING THE GAP BETWEEN ADJACENT SHROUD PLATES IN LIQUID-COOLED GAS TURBINE

John H. Eskesen, and Herman M. Leibowitz, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 21, 1976, Ser. No. 678,950

Int. Cl.[2] F01D *9/04*

U.S. Cl. 416—191 **5 Claims**



1. In an elastic fluid-utilizing apparatus wherein are mounted a rotor member rotatable about a central axis, an annular row of vanes mounted on said rotor member, a shroud plate segment affixed to each of said vanes, said shroud plate segments having adjacent end faces spaced apart and defining longitudinally extending gaps therebetween, flow discharge means interconnecting each of said vanes and the radially outer surface of the shroud plate segment affixed thereto to provide for the passage of fluid discharged from said vanes to the region radially outward of said shroud plate segments, said region being defined in part by rib portions extending along each side of each shroud plate segment, the improvement comprising:

each of said adjacent end faces of said shroud plate segments having a chamfer extending longitudinally along the radially inner edge thereof as a planar surface, each pair of adjacent chamfered portions defining a straight longitudinally-extending recess,

a single longitudinally-extending sealing bar disposed in and along each such recess by means of holding means rigidly affixed to each end of said sealing bar, each holding means having a tab portion overlying the radially outer surfaces of a pair of adjacent shroud plates whereby each sealing bar can move only a limited distance in the radially inward direction and is moved into contact with the juxtaposed chamfered portions when subjected to sufficient centrifugal force.

4,177,012

FAN BLADE WITH BENDS FORMING GENERAL BLADE CURVATURE

Herbert N. Charles, Chatham, Canada, assignor to Fram Corporation, East Providence, R.I.

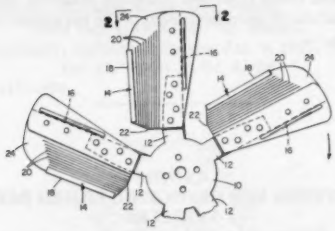
Filed Mar. 15, 1978, Ser. No. 886,678

Int. Cl.[2] F04D *29/38*

U.S. Cl. 416—132 A **6 Claims**

1. An automotive cooling fan comprising a plurality of generally radially extending fan blades of flexible, resilient blade material secured to arms of a fan spider projecting radially from a hub, said blades fastened to said arms at their leading edges, defined by the direction of fan rotation, and extending transversely behind said blades to trailing edges, said blades curved in a downstream direction, relative to the direction of air flow, between said leading and trailing edges, and said blades free to flex and decamber in an upstream direction with increasing rotational speeds, characterized in that a multiplic-

ity of generally radially extending bends are provided in each said flexible, resilient blade between said leading and trailing



edges behind said arm said bends spaced apart and forming the downstream general curvature of said blade.

4,177,013

COMPRESSOR ROTOR STAGE

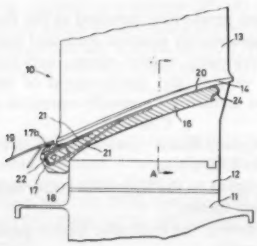
James Patterson, Allestree, and Peter G. G. Farrar, Mickleover, both of England, assignors to Rolls-Royce Limited, London, England

Filed Jan. 9, 1978, Ser. No. 868,228

Claims priority, application United Kingdom, Jan. 11, 1977, 862/77

Int. Cl.² F01D *5/22, 5/10*

U.S. Cl. 416—193 A **8 Claims**



1. A rotor stage for a gas turbine engine comprising:

a rotor disc;

an annular array of aerofoil blades, each of said aerofoil blades being provided with a root portion adapted to locate in said rotor disc and circumferentially extending platforms spaced radially outwardly of said root portion and arranged so as to be circumferentially spaced apart from platforms of adjacent blades; and

a plurality of elongated dampers made from an elastomeric material, each of said elastomeric dampers having an enlarged head portion at one of its extents, said enlarged head portion being located against a radial face of said rotor disc and against adjacent platform and roots of adjacent blades in such a manner that the remainder of said elastomeric damper is permitted to be circumferentially urged into engagement with said platforms but is constrained against movement in an axial direction, said enlarged head portion of each damper being further provided with an inlaid portion arranged to resist fretting between the head portion and the platform and root portions of said adjacent blades and against the radial face of said rotor disc.

4,177,014

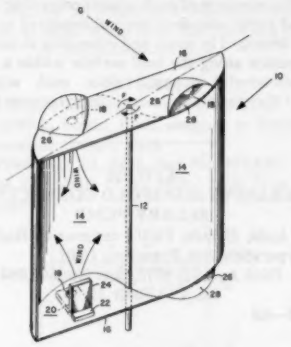
FLUID OPERATED ROTOR

John W. Kephart, Jr., 1115 Norsam Rd., Gladwyne, Pa. 19035

Filed Jan. 22, 1979, Ser. No. 5,083

Int. Cl.² F03D *3/06*

U.S. Cl. 416—197 A **9 Claims**



1. A fluid operated rotor device comprising

A. a main body having a pair of fluid receptive dished sections rotatably mounted side by side with the inner sides thereof presenting in opposite directions,

B. passageways through the rims of said dished sections placing the inner sides thereof in direct communication with atmosphere,

C. means overlying each passageway presenting in the direction opposite to that in which the inner side of the associated dished section presents and operative for directing fluid into said passageway, and

D. a unidirectional valve for each of said passageways arranged for being automatically opened by said fluid when the inner side of the associated dished section presents in the direction of fluid flow, and arranged for being automatically closed by said fluid when the inner side of the dished section presents in the opposite direction.

4,177,015

ELECTROMAGNETIC PUMPS

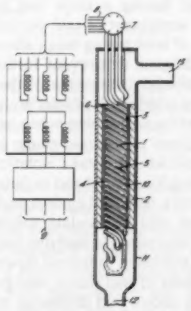
Daniel F. Davidson, Altrincham, England, assignor to United Kingdom Atomic Energy Authority, London, England

Filed Mar. 9, 1978, Ser. No. 885,016

Claims priority, application United Kingdom, Mar. 23, 1977, 12345/77

Int. Cl.² H02N *4/20*

U.S. Cl. 417—50 **5 Claims**



1. An electromagnetic pump for liquid metal comprising a tubular pump housing,

a core co-axially disposed within a bore of the housing to define an annular flow passage between the wall surface of the core and the wall surface of the bore,

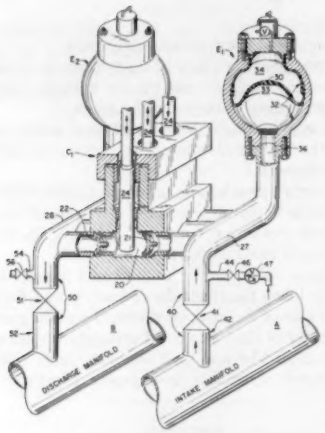
polyphase helical windings arranged co-axially with the core, the helical windings being located in equally angularly spaced helical slots formed in one of the wall surfaces, the windings of each phase comprising a plurality of loops of metal sheathed mineral insulated electrical conductor arranged in series and extending in each longitudinal direction along the wall surface within a discrete pair of diametrically opposed slots, each winding being adapted for connection to an external source of electricity supply.

4,177,016

SELF CLEANING MANIFOLD CONNECTION FOR SLURRY PUMP

Thomas C. Aude, Orinda, Calif., assignor to Bechtel International Corporation, San Francisco, Calif.

Filed Apr. 17, 1978, Ser. No. 896,964
Int. Cl.[2] F04B *39/00*
U.S. Cl. 417—53 **7 Claims**



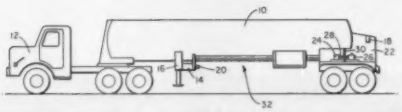
1. Apparatus in a slurry pipeline station for pumping slurry containing particulate matter entrained in a fluid, said station having an intake manifold for receiving slurry from a slurry pipeline and at least one pump for passing slurry from said intake manifold to a discharge manifold and preventing back flow from said discharge manifold to said intake manifold and inlet and outlet piping for connecting said pumps to said respective inlet and outlet manifolds, the improvement in said inlet and outlet piping including: inlet piping to said pump from said inlet manifold having a slope and length sufficient to permit downward settlement of said particulate matter in said slurry, said length of inlet piping being above said intake manifold a sufficient distance to prevent turbulence in said fluid from causing substantial penetration of the particulate matter of said slurry above said length of inlet piping into an occluded passageway formed by said piping when said pump is stopped and fluid does not pass across said pump between said intake and discharge manifolds; an intake isolation valve above said length of inlet piping for closing and isolating the intake of said pump from said intake manifold against said fluid of said slurry upon settlement of said particulate matter from said fluid; outlet piping from said pump to said discharge manifold having a slope and length sufficient to permit downward settlement of said particulate matter of said slurry, said preselected length of outlet piping being above said discharge manifold a sufficient interval to prevent turbulence in said fluid from causing substantial penetration of the particulate matter of said slurry above said length of inlet piping into an occluded passage formed by said discharge piping when said pump is stopped and fluid does not pass across said pump between said discharge and intake manifolds; and an outlet isolation valve above said slurry penetration level for closing and isolating the outlet of said pump from said discharge manifold against said fluid of said slurry upon settlement of the particulate matter of said slurry.

4,177,017

PUMP SYSTEM FOR CRYOGENIC LIQUID DELIVERY VEHICLES

Jeffrey A. Schultz, East Rochester, N.H., assignor to Process Engineering, Inc., Plaistow, N.H.

Continuation of Ser. No. 741,193, Nov. 12, 1976, abandoned.
This application Jun. 5, 1978, Ser. No. 912,540
Int. Cl.[2] F04B *9/08, 17/00;* F17C *7/02;* B60P *3/22*
U.S. Cl. 417—231 **4 Claims**



1. A pumping system for cryogenic liquid delivery vehicles that include a tractor and trailer that is substantially longer than the tractor having forward and rear ends comprising;

self-contained internal combustion engine means having control means associated therewith,

means for mounting the internal combustion engine means at a forward end of the trailer remote from the rear end of the trailer,

hydraulic pump means also mounted at the forward end of the trailer operatively coupled from and operated by the internal combustion engine means, and having control means for varying the displacement of said hydraulic pump means including a manually-operated control member,

said hydraulic pump means operating up to 60 horsepower at speeds up to 4000 r.p.m.,

a reservoir coupled to the hydraulic pump means,

hydraulic motor means,

means for mounting the hydraulic motor means at the rear end of the trailer,

said hydraulic motor means including a high speed hydraulic motor capable of transmitting up to 60 horsepower at speeds up to 7500 r.p.m.,

hydraulic fluid line means intercoupled between the hydraulic pump and hydraulic motor means and forming therewith a closed loop hydrostatic transmission system including a main flow line and a return line carrying a hydraulic fluid that is a phosphate-ester composition,

means defining an enclosed cabinet at the rear end of the trailer having a control panel,

said hydraulic pump control member and internal combustion engine control means being disposed in said cabinet and associated with said control panel,

and a cryogenic liquid pump means disposed at the rear end of the trailer adjacent the hydraulic motor means and driven from the hydraulic motor means,

said liquid pump means for pumping cryogenic liquid from the vehicle,

safety barrier means separating the hydraulic motor means and liquid pump means,

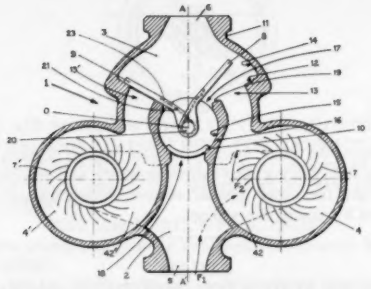
said internal combustion engine means being disposed for safety purposes sufficiently remote from said cryogenic liquid pump means.

4,177,018

APPARATUS FOR REGULATING THE PASSAGE AND FLOW-RATE OF A LIQUID

Jacques R. Granet, Laval, France, assignor to Le Material Telephonique, Boulogne-Billancourt, France

Filed Jan. 4, 1978, Ser. No. 866,841
Claims priority, application France, Jan. 4, 1977, 77 00058
Int. Cl.[2] F04B *23/04, 41/06*
U.S. Cl. 417—338 2 Claims



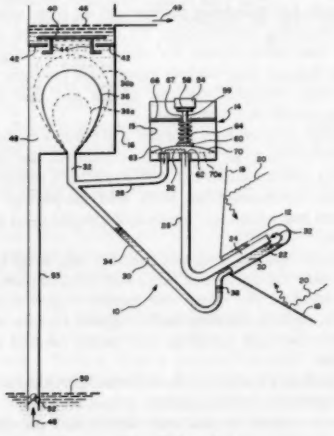
1. A liquid pumping unit comprising two centrifugal pumps disposed in a common casing (1) providing an inlet chamber (2) and an outlet chamber (3) for the liquid, each pump comprising an impeller mounted in a volute (4, 4') and adapted to be driven by a motor, each volute having an inlet (42, 42') and an outlet (13, 13') communicating with the inlet and outlet chambers (5, 6) respectively, a two flap type check valve (8, 9) is rotatably mounted on a common shaft (20), each flap being able to close one outlet of a volute (13, 13'), the shaft (20) has a regulating valve (10) secured thereto and controlled thereby, the regulating valve being mounted in a passage (17–18) connecting said outlet and inlet, to block or adjustably permit the flow of fluid in said passage, and thus can by-pass the fluid from the outlet(s) to the inlet(s) of the volute(s) when the flap(s) are open.

4,177,019

HEAT-POWERED WATER PUMP

Duane G. Chadwick, Logan, Utah, assignor to Utah State University Foundation, Logan, Utah

Filed Mar. 27, 1978, Ser. No. 890,095
Int. Cl.[2] F04B *17/00;* F03G *7/02, 7/06*
U.S. Cl. 417—379 15 Claims



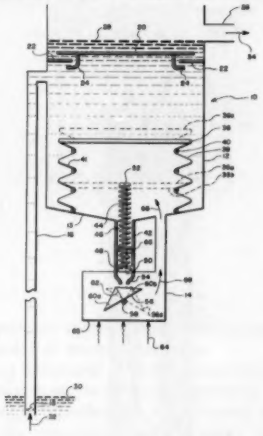
4. A water pump comprising:
a vapor generator;
valve means for controlling release of vapor from the vapor generator the valve means being configurated to have a first, greater resistance to initial opening and is held open under a second, lesser opening force by vapor from the vapor generator; and
a pumping chamber having a pumping member operable by said vapor to expel water from the pumping chamber.

4,177,020

HEAT-POWERED WATER PUMP

Duane G. Chadwick, Logan, Utah, assignor to Utah State University Foundation, Logan, Utah

Filed Mar. 31, 1978, Ser. No. 891,993
Int. Cl.[2] F04B *17/00;* F03G *7/02, 7/06*
U.S. Cl. 417—379 12 Claims



4. A heat-powered water pump comprising:
a pumping chamber;
an inflatable pumping member in the pumping chamber;
a vapor generator comprising condensate metering means for metering condensate to a heat means, the heat means vaporizing the condensate, the condensate metering means comprising a condensate reservoir and valve means for releasing condensate from the condensate reservoir, the condensate metering means further comprising a tipping bucket configurated with two buckets, each bucket accommodating receipt of a predetermined quantity of condensate before becoming over-balanced and discharging condensate from the bucket; and
means for directing vapor from the vapor generator into the pumping chamber.

4,177,021

THROUGH FLOW SUMP PUMP

Karl O. Niedermeyer, 17W068 North St., Bensenville, Ill. 60106

Filed May 3, 1977, Ser. No. 793,402
Int. Cl.[2] F04B *17/00, 35/04*
U.S. Cl. 417—424 16 Claims

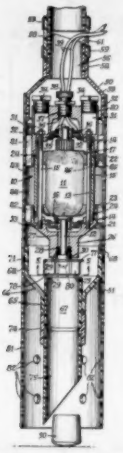
1. A pump for use as a sump pump or the like in pumping a liquid and utilizing pipe of standard sizes of internal and external diameter about an axis, said pump comprising:
an electric motor including a waterproof housing of a given diameter, and a motor shaft defining an axis and with a portion of the shaft externally of said housing;
a pump impeller affixed to said portion of said shaft;
a length of a first size of said pipe having an internal diameter significantly greater in internal diameter than is said given diameter, said length surrounding said motor and having a

first end adjacent the said impeller and a second end adjacent the other end of the motor;

means affixing the motor to the length of pipe and spacing said housing at all sides thereof from said pipe whereby there is space substantially all about said motor for the flow of liquid in a generally axial direction;

conduit means connected to said second end of said length of pipe and forming the discharge for said pump;

a reducer having a large end and a small end, said large end telescopically mating with and engaging said first end of said length of pipe, said small end being of a size substantially smaller than said given diameter and including conduit means extending to a location adjacent said impeller and forming the intake for said pump, said large end of said reducer being in the form of a cylindrical sleeve of an external diameter substantially corresponding to said given diameter and extending within said first end, and said small end of said reducer being in the form of a cylin-



drical sleeve having an internal diameter substantially corresponding to the external diameter of another of said standard sizes, said other standard size being substantially smaller than said first size, whereby the last mentioned sleeve can be used as a coupling for said other size, said first mentioned cylindrical sleeve extending only partially into said first end and having a portion externally of said first end;

another length of said pipe of said first size, said other length being telescopically mounted on said external portion, said other length having openings therethrough whereby said liquid may flow through said openings into the interior of the other length and the other length acts as a pump screen; and

a piece of pipe of said other of said standard sizes telescopically mounted in said smaller of said sleeves and projecting outwardly therefrom and into said other pipe of said first size to serve as an intake conduit for said pump.

4,177,022

VESSEL PUMP

Peter F. Roth, Schmittenackerstrasse 14, 8304 Wallisellen, Switzerland

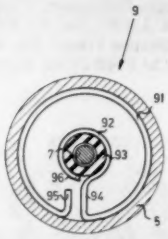
Filed Mar. 29, 1978, Ser. No. 891,406

Claims priority, application Switzerland, Mar. 30, 1977, 4012/77

Int. Cl.[2] F04B *35/04*

U.S. Cl. 417—424 **11 Claims**

1. A vessel pump comprising a driving motor, a driving shaft driven by said motor and extending in a delivery pipe and having a delivery rotor arranged in the lower region of said driving shaft, characterized by the fact that said driving shaft is provided in at least one location with a resilient bearing supported in said delivery pipe, said bearing comprising two concentrically arranged annular retainer springs consisting of a



single piece, the inner annular retainer spring holding a replaceable slide bearing sleeve through which said driving shaft extends and the outer annular retainer spring adjacent and supported by said delivery pipe.

4,177,023

PNEUMATIC SYSTEM FOR SMOOTHING DISCHARGE PRESSURE FROM AIR

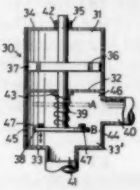
Tamotsu Kamiya, Kariya, and Shigeru Miyao, Toyoda, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyoda, Japan

Continuation of Ser. No. 586,589, Jun. 13, 1975, abandoned. This application Apr. 18, 1977, Ser. No. 788,450

Claims priority, application Japan, Feb. 25, 1975, 50-25697

Int. Cl.[2] F04B *11/00*

U.S. Cl. 417—540 **1 Claim**



1. In a pneumatic system including an air pump, air passage switching means and operating components, said air passage switching means being communicated with said air pump via a conduit and being communicated with each of said operating components for delivering pressurized air from said air pump to said operating components, the improvements comprising pressure smoothing means for smoothing the surge pressure being discharged from said air pump, said pressure smoothing means being between said air pump and said air-passage switching means and comprising:

a chamber defined by a circular top plate, a circular bottom plate having an air inlet which communicates with said air pump, and a cylindrical peripheral wall which has an air outlet communicating with said air-passage switching means and which surrounds said top plate and said bottom plate;

a partition wall dividing said chamber into an air chamber on one side thereof which faces said bottom plate and an oil chamber on the other side thereof which faces said top plate, said air chamber including said air inlet and said air outlet and said partition wall being parallel to said top plate;

a rod slidingly extending through said partition wall and said top plate in coaxial relation to said air inlet;

a piston secured to said rod within said oil chamber and having through-holes defined therein for oil;

a pressure receiving plate secured to said rod within said air

chamber and having a periphery spaced from the peripheral wall of said air chamber to define a clearance therebetween, said pressure receiving plate being disposed in opposing relation to said air inlet;

a compression spring between said pressure receiving plate and said partition wall; and

oil filled in said oil chamber.

4,177,024

VANE AIR MOTOR WITH ECCENTRIC ADJUSTMENT RING AND BEARING RING FOR VANE ENDS

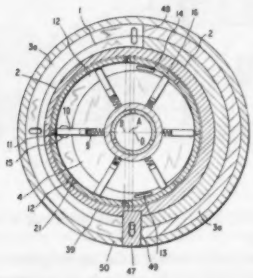
Gerd Löhn, Biberach, Fed. Rep. of Germany, assignor to Kaltenbach & Voigt GmbH & Co., Biberach an der Riss, Fed. Rep. of Germany

Filed May 5, 1977, Ser. No. 794,227

Claims priority, application Fed. Rep. of Germany, May 14, 1976, 2621485

Int. Cl.[2] F01C *1/00, 21/16;* F16C *35/00, 35/04*

U.S. Cl. 418—16 15 Claims



1. A pneumatic vane-type motor for a dental handpiece to drive a dental tool operable by compressed air and comprising:

a sleeve-like housing having a cylindrical inner surface which is circular in cross-section and which forms a stator, said stator forming a rotor chamber; a rotor mounted for rotation in said rotor chamber about an axis which extends parallel to the axis of said inner surface;

axially extending slots provided in said rotor;

rotor vanes radially movably mounted in said slots and extending with their radially outer ends towards said inner surface of the housing;

air inlet means communicating with said rotor chamber for supplying compressed air to drive the rotor;

air outlet means communicating with said rotor chamber;

an adjusting ring positioned between said inner surface of the housing and said outer ends of the vanes, said ring being rotatable relative to said inner surface of the housing;

a cylindrical outer surface provided on said adjustment ring which engages said inner surface of the housing;

a cylindrical inner surface provided on said adjustment ring and towards which the vanes extend, the inner and outer surfaces of said adjustment ring being circular in cross-section and having axes which are spaced from each other; and a bearing ring positioned between said inner surface of the adjustment ring and said outer ends of the vanes, said bearing ring being co-axial with and freely rotatable relative to said inner surface of the adjustment ring, and said outer ends of the vanes bearing against said bearing ring.

4,177,025

HIGH-PRESSURE ROTARY FLUID-DISPLACING MACHINE

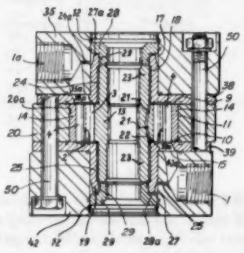
Siegfried Eisenmann, and Hermann Härle, both of Aulendorf, Fed. Rep. of Germany, assignors to Fürstlich Hohenzollernsche Hüttenverwaltung Laucherthal, Hohenzollern, Fed. Rep. of Germany

Filed Jul. 1, 1977, Ser. No. 812,392

Claims priority, application Fed. Rep. of Germany, Jul. 6, 1976, 2630222

Int. Cl.[2] F04C *15/00*

U.S. Cl. 418—133 25 Claims



1. A high-pressure rotary fluid-displacing machine suitable for use as a motor or pump comprising

(a) a housing composed of at least two parts and having a first channel in said housing for conveying medium under high-pressure therethrough and a second channel in said housing for conveying medium under lower pressure therethrough,

(b) an internally toothed annular gear;

(c) an externally toothed pinion arranged eccentrically within said annular gear and intermeshing therewith, an engagement-free crescent shaped gap being left between the addendum circles of said pinion and of said annular gear, respectively, on the side thereof opposite the contact point of the pitch circle of said pinion with the pitch circle of said annular gear;

(d) a shaft bearing said pinion and being adapted for transmitting torque;

(e) a gap-filling member in said gap having an inner and an outer curved surface, said inner surface being sealingly contacted by the addendum surfaces of the teeth of said pinion, and said outer surface being sealingly contacted by the addendum surfaces of the teeth of said annular gear,

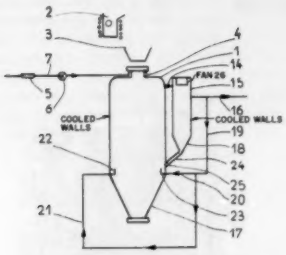
(f) at least a first lateral plate member held in place by at least one part of said housing and being adapted for closing off laterally a work space intermediate the teeth of said pinion and the teeth of said annular gear and disposed in axial direction on one side of said pinion and annular gear, the central region of said plate member being movable with a slight clearance relative to said pinion, said plate member having an external rim portion clamped in between two parts of said housing; and

(g) a collar on said plate member and projecting from the face of the latter away from said pinion and annular gear and adapted for bearing said shaft therein; said housing having an internal chamber into which said collar protrudes, said internal chamber being in free communication with said first channel, whereby said plate member can be subjected to high-pressure exerted by said high-pressure medium.

4,177,026
DEVICE FOR THE MANUFACTURE OF SPHERICAL METALLIC POWDER

Yves C. Honnorat, Imphy; Gerard D. Raisson, and Jean G. Morlet, both of Nevers, all of France, assignors to Creusot-Loire, Paris, France

Filed Sep. 26, 1977, Ser. No. 836,711
Claims priority, application France, Oct. 1, 1976, 76 29654
Int. Cl.[2] B22D *23/08*
U.S. Cl. 425—7 6 Claims



1. In a device for the manufacture of a metallic powder by atomizing liquid metal, the device comprising a vertical cylindro-conical vessel having cooled walls comprising:

in its upper part, means for introducing a stream of liquid metal into said vessel, means for atomizing the stream of metal using jets of gas under pressure, and

at least one gas outlet for gas charged with fine particles of the metal,

in its lower part, a funnel for receiving and discharging the powder,

in its lower half, gas inlet means for providing one or more jets of gas tangentially to a common cylinder centered on the axis of said vessel and forming an angle of between 0° and 60° with a horizontal plane, for generating vortices of gas charged with fine particles of the metal along an ascending spiral centered on the axis of said vessel so as to multiply the impacts between the fine particles of the powder and the cooled walls of said vessel and thus to increase the heat exchanges between the matter located in said vessel, consisting of the gas and the falling powder, and the cooled walls of said vessel,

a cyclone dust remover having cooled walls and connected between said gas outlet means and having a fan operable to cause circulation of gas between said gas outlet and said gas inlet means located in the lower half of said vessel

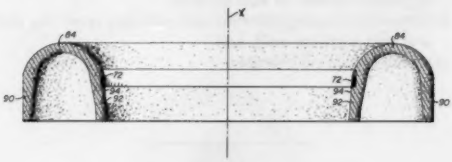
the improvement consisting of a duct joining the funnel of said cyclone dust remover to said vessel in the immediate vicinity of said gas inlet means, said duct allowing the fine particles of the powder recovered by said dust remover to be reintroduced into said vessel.

4,177,027
CORE PORTION FOR A TUBE TIRE

Charles E. Grawey; Glenn A. Ball, both of Peoria, and Donald G. Zook, Metamora, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 635,812, Nov. 28, 1975, abandoned, which is a continuation of Ser. No. 491,841, Jul. 25, 1974, abandoned, which is a division of Ser. No. 370,204, Jun. 15, 1973, Pat. No. 3,883,287. This application Mar. 20, 1978, Ser. No. 888,706
Int. Cl.[2] B29H *5/18*
U.S. Cl. 425—49 7 Claims

1. An annular core portion, combinable with another like annular core portion for defining a hollow core upon which a tube tire can be formed, comprising; an annular substantially inextensible member and a mixture of granular material and a binder formed about said annular substantially inextensible member, said core portion having a generally U-shaped cross sectional configuration having inner and outer legs, said inner leg having a surface facing the axis of the annular core portion,

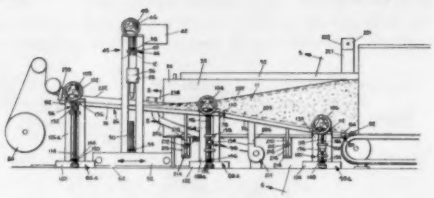


said annular substantially inextensible member being positioned at said surface of the inner leg.

4,177,028
ADJUSTABLE APPARATUS FOR PRODUCING A FOAM MATERIAL

James G. Dillard, Grand Rapids, Mich., assignor to Edge Saw Manufacturing Co., Grand Rapids, Mich.

Filed Oct. 4, 1977, Ser. No. 839,323
Int. Cl.[2] B29D *27/04*
U.S. Cl. 425—89 13 Claims



1. An apparatus for continuously molding a foamable material comprising:

a conveyor support having a flat upper plate at a declination to the horizontal slight enough to substantially preclude liquid foamable reactants from flowing therealong, a flat lower support member in abutting relationship to the upper plate and at a declination to the horizontal greater than that of the upper plate; and a longer horizontal curing portion joined to the lower support member;

means operatively associated with said conveyor support for conveying the foamable material over the conveyor support from the upper plate to the horizontal curing portion thereof;

means mounted above the conveyor support upper plate or supplying unfoamed liquid foam reactants to the conveying means at the upper plate of the conveyor support;

the length of the upper plate being sufficient to permit creaming thereon of the unfoamed liquid reactants which are supplied thereto by said liquid foam reactants supply means;

the length of the lower support member being sufficient to permit substantially complete foaming of the creamed foamable reactants thereon;

means for controlling the upper contour of the molded foam including side wall surfaces moving along adjacent the conveying means and at an inclined angle with respect to the lower support member of the conveying means;

means connected to the supplying means for adjusting the longitudinal position of the supplying means to adjust the lay-down point of the foamable materials on the conveyor with respect to the upper plate of the conveyor support;

means for adjustably moving at least one side wall surface in a direction transverse to the plane of the side wall surfaces to control the width of the space between the side wall surfaces;

means for adjusting the width of the upper plate and lower

support member of the conveyor support to correspond to adjustments to the side wall position; and

means for adjusting the relative angle of the upper plate and lower support member of the conveyor support to control the angles thereof with respect to the horizontal.

4,177,029

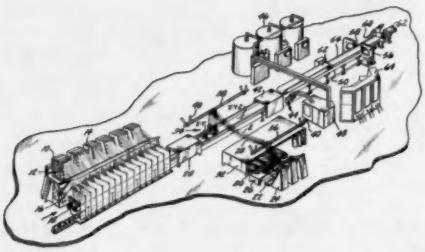
APPARATUS FOR CONTINUOUSLY FABRICATING THREE-DIMENSIONAL FILAMENT REINFORCED FOAM INSULATION

William B. Goldsworthy, Palos Verdes, Calif., and Harald E. Karlson, Eugene, Oreg., assignors to McDonnell Douglas Corporation, Long Beach, Calif.

Division of Ser. No. 669,819, Mar. 24, 1976, Pat. No. 4,079,106, which is a continuation of Ser. No. 516,412, Oct. 21, 1974, abandoned. This application Oct. 31, 1977, Ser. No. 847,238

Int. Cl.[2] B29D *27/04*

U.S. Cl. 425—112 **6 Claims**



1. Apparatus for continuously forming three-dimensional filament reinforced foam insulation, comprising means for extending a plurality of continuous first layers of spaced X fibers in a longitudinal direction, said first layers being spaced vertically from each other, means for extending a plurality of second layers of spaced Y fibers in a transverse direction, said second layers being spaced vertically from each other, and forming an X-Y array, means operatively associated with both of said extending means, for continuously moving said layers of X and Y fibers together in a path of travel in a longitudinal direction, means for inserting Z fibers through said layers to form an X-Y-Z array during said longitudinal movement of said layers of X and Y fibers, and means for foaming an insulation material through said array during continuous movement of said X-Y-Z array in a longitudinal direction.

4,177,030

DOUGH DIVIDER

Samuel O. Seiling, Richmond, Va., assignor to AMF Incorporated, White Plains, N.Y.

Filed May 1, 1978, Ser. No. 901,410

Int. Cl.[2] B29C *1/00*

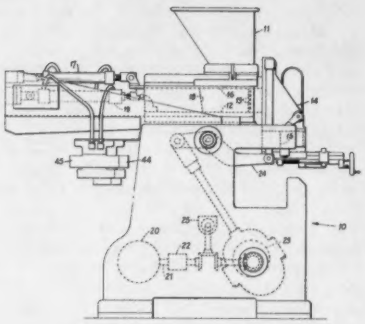
U.S. Cl. 425—238 **6 Claims**

1. In a dough divider having a repetative operating cycle for successively making groups of equal lumps of dough, a combination comprising:

a charging chamber and dividing means for dough disposed in one end of said chamber; and

ram means movable toward and away from said dividing means twice during each operating cycle and causing dough to load said chamber each time it moves away from said dividing means;

said ram means exerting a constant force moving dough through said dividing means and out of said chamber the first time it moves toward said dividing means during each cycle, and purging dough from said chamber the second



time it moves toward said dividing means during each cycle.

4,177,031

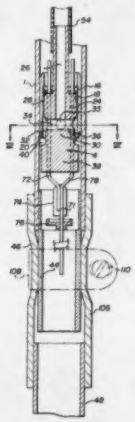
APPARATUS FOR CASTING TUBULAR, POLYMERIC MEMBRANES FOR REVERSE OSMOSIS AND ULTRAFILTRATION

William L. Thayer; Lucien Pageau, and Srinivasa Sourirajan, all of Ottawa, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Mar. 3, 1978, Ser. No. 883,267

Int. Cl.[2] B29D *23/08, 27/04*

U.S. Cl. 425—460 **2 Claims**



1. In an apparatus for casting tubular, polymeric membranes for reverse osmosis and ultrafiltration, comprising:

(a) a plurality of upwardly extending casting tubes,

(b) a casting bob assembly for insertion in the lower end of the bore of each of the casting tubes,

(c) mounting means for mounting each casting tube, with the casting bob assembly in the lower end thereof, for relative movement therebetween, whereby the casting bob assembly may be displaced along the bore of each casting tube when placed therein,

(d) means for supplying a casting solution to the casting bob assembly,

(e) means for supplying a gas to the bore of each casting tube, below the casting bob assembly, when the casting bob assembly is inserted therein,

(f) means for feeding a gelation liquid to the bore at the lower

end of each casting tube when the casting bob assembly is inserted therein, and wherein:

(g) the casting bob assembly comprises:

(i) a centering sleeve, slidably along the bore of each casting tube, and having an open ended, upwardly extending bore, at least a portion of which is screw threaded, and a lower cylindrical extension inwardly spaced from each casting tube when placed therein,

(ii) a casting bob having an upper portion which has a downwardly extending casting solution passage therethrough and which is screw threaded externally with the screw thread screwed into the screw threaded portion of the centering sleeve, an intermediate portion which is integral with the upper portion and protrudes from a lower end of the bore of the centering sleeve and defines an annular, casting solution outlet with the centering sleeve, the intermediate portion having casting solution passage means for distributing around the annular casting solution outlet, casting solution from the downwardly extending passage, and a lower cylindrical portion integral with the intermediate portion and beneath the cylindrical extension and defining an annular, casting solution outlet gap therewith which is adjustable by screwing the upper portion into the centering sleeve, the lower portion being spaced from casting tube when placed therein to define an annular casting space therewith, the improvement comprising:

(h) the casting bob assembly includes:

(i) a transport sleeve slidable upwardly as a press fit around the lower portion of the casting bob to seal against and around the lower, cylindrical extension and seal the annular, casting solution outlet gap while the casting bob assembly is being transported from one casting tube to another, the transport sleeve being s[illegible]ble along the bore of each casting tube when inserted therein; and

(ii) securing means for releasably securing the transport sleeve in the lower end of each casting tube and sealing the lower end of each casting tube to the mounting means.

4,177,032

MOLDING CORE FOR THE MANUFACTURE OF HOLLOW BODIES CONSISTING OF FIBER-REINFORCED SYNTHETIC RESIN

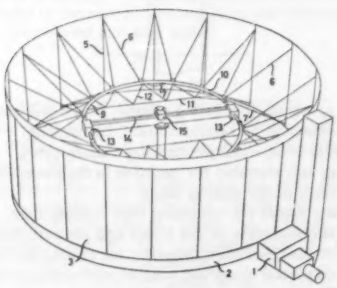
Peter H. Selden, Ludwigshafen; Joachim Duerkop, Frankenthal; Wolfgang Albrecht, Ludwigshafen, and Heinz Weissenmayer, Boehl-Iggelheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Filed Oct. 26, 1977, Ser. No. 845,720

Claims priority, application Fed. Rep. of Germany, Nov. 20, 1976, 2652862

Int. Cl.[2] B29C *1/12*

U.S. Cl. 425—468 **1 Claim**



1. An internal molding core for the manufacture of hollow, fiber-reinforced synthetic resin bodies of various diameters, said molding core comprising:

a plurality of curved rectangular flexible metal plates which are positioned in a circular arrangement with their vertical side edges abutting one another,

detachable connecting members interconnecting said abutting vertical side edges,

tensioning means interconnecting the vertical side edges of each flexible metal plate in a manner so as to permit the radius of curvature of said plates to be adjusted,

two of said flexible metal plates which are diametrically opposed to each other and which devide said molding core into two halves being hinged along one vertical side edge thereof so as to permit their inward rotation toward the center of said molding core,

a pair of frames which vertically and inwardly support the flexible metal plates located on each molding half by means of adjustable support members extending between each frame and the flexible metal plates between said opposed rotatable plates which comprise each of said molding halves, and

a common drive means interconnecting said frames which allows said frames to be moved toward one another after said opposed rotatable plates have been inwardly rotated in a manner so as to reduce the distance between said molding halves and permit said hollow body to be removed from about said molding core,

said flexible metal plates being mounted about their lower edges on a rotatable, annularly-shaped platform which permits the rotation of said molding core as said hollow body is formed thereabout.

4,177,033

FLAME DETECTION ARRANGEMENTS AND THE LIKE

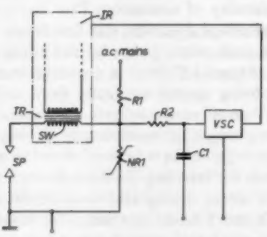
Malcolm R. Wallace, Fareham, England, assignor to Plessey Handel und Investments AG, Zug, Switzerland

Filed Nov. 22, 1977, Ser. No. 853,873

Claims priority, application United Kingdom, Nov. 25, 1976, 49219/76

Int. Cl.[2] F23H *5/08*

U.S. Cl. 431—78 **8 Claims**



1. A circuit arrangement for detecting flame or hot gas in an air gap using the flame "rectification effect" comprising electrode means defining said air gap and connected on one side to an a.c. source and on the other side to a suitable potential for permitting current to flow in said air gap when flame or hot gas is present therein, non-linear resistance means connected across said air gap, voltage sensing means for detecting the voltage across the non-linear resistance means which is indicative of the presence or absence of flame or hot gas in said air gap, and filter means connected in the input path to the voltage sensing means so that any voltage appearing at the input to the voltage sensing means is a d.c. voltage with a small ripple superimposed thereon.

4,177,034

RETROFIT IGNITER

Richard E. Jones, Los Alamitos, Calif., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Dec. 29, 1977, Ser. No. 865,406

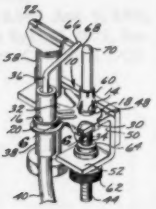
Int. Cl.[2] F23N *5/10;* **F23Q** *9/00;* **F16L** *3/08;* **H01L** *35/00*

U.S. Cl. 431—264 **5 Claims**

1. A bracket for retro-fit conversion of a continuous to an

intermittent operating gas pilot burner having a pilot burner and a flame sensor mounted in side-by-side alignment on a support member which comprises:

(a) a flat web with first and second spaced-apart distal apertures and upstanding peripheral flanges about said apertures;



(b) stiffening rib means in the central portion of said web between, and parallel to the alignment of, said apertures;

(c) a pair of bendable tabs laterally projecting from said web adjacent one of said apertures; and

(d) a second pair of bendable tabs projecting from opposite side edges of the central portion of said web toward the other of said apertures.

4,177,035

TUNNEL KILN FOR FIRING CERAMIC WARE

Gregor Buschermohle, Ibbenbueren, Fed. Rep. of Germany, assignor to Keller Ofenbau GmbH, Fed. Rep. of Germany

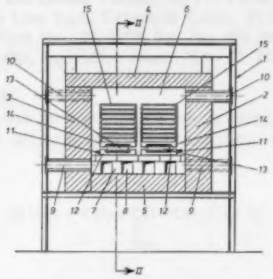
Filed Mar. 16, 1978, Ser. No. 887,385

Claims priority, application Fed. Rep. of Germany, Jun. 10, 1977, 2726199; Sep. 22, 1977, 2742599

Int. Cl.[2] F27B 9/06

U.S. Cl. 432—121 **10 Claims**

1. A tunnel kiln through which carriers carry ceramic ware to be fired comprising elongated tunnel means having a closed bottom, a stationary flue at the bottom of said tunnel means, at least one transport way disposed in said tunnel means above said stationary flue, carriers carried by said transport way through the tunnel means, said transport way comprising a support means, and rolling means between said support means and said carrier for movably carrying said carriers along said transport way, said support means comprising a pair of spaced and elongated cylindrical members having their longitudinal



axes disposed parallel to the elongated tunnel means, said rolling means rolling on said spaced cylindrical members.

4,177,036

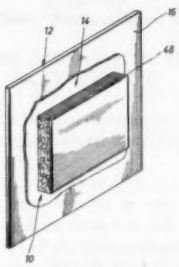
HIGH TEMPERATURE INDUSTRIAL FURNACE

Robert A. Sauder, Emporia, Kans., assignor to Sauder Industries, Inc., Emporia, Kans.

Continuation-in-part of Ser. No. 694,562, Jun. 10, 1976, abandoned. This application Sep. 6, 1977, Ser. No. 830,612

Int. Cl.[2] F27D 1/00

U.S. Cl. 432—247 **20 Claims**



1. A high temperature industrial furnace comprising:

a metal chamber wall having an inside surface and an outside surface;

an insulation module positioned over said inside surface of said wall;

a flexible adhesive intermediate said inside surface of said wall and said module, said flexible adhesive being operable to support said module over said wall and flexibly resist cracking during thermal movement of said wall during operation of said furnace.

4,177,037

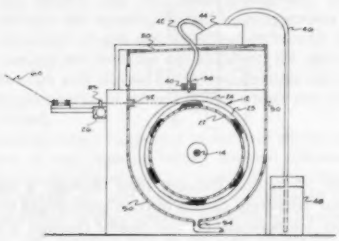
METHOD FOR MULTICOLOR DYEING OF TEXTILE YARNS

Harald Anderson, deceased, late of Summit, N.J., by Aelita Anderson, administrator, 18 King's Hill Court, Summit, N.J. 07901, and by Michael S. Cozine, administrator, 140 Market St., Paterson, N.J. 07505

Division of Ser. No. 712,186, Aug. 6, 1976, Pat. No. 4,068,502. This application Sep. 23, 1977, Ser. No. 836,069

Int. Cl.[2] D06B *1/02*

U.S. Cl. 8—149 4 Claims



1. A method for the high speed dyeing of a moving yarn strand to obtain a multicolored yarn product having uniformly dyed lengths of different color with sharply defined color boundaries therebetween, comprising the simultaneous steps of:

(a) winding a running yarn strand onto a rotating support member to form a plurality of yarn layers thereon;

(b) applying a plurality of discrete cohesive streams of dye to the outer surface of said layers while said yarn is being wound to form a plurality of radial bands of selected color in said layers located along the length of the support member;

(c) rotating said support member at a sufficient rate of speed to cause centrifugal flow of portions of dye in inner yarn layers in said radial bands of color radially outwardly in said bands to penetrate outer yarn layers therein; and

(d) traversing the yarn strand across the support member to locate selected lengths of yarn in each of said radial bands of color.

4,177,038

METHOD FOR THE PRODUCTION OF A VEHICLE SUBSTANCE WHICH IS CAPABLE OF COVALENT BONDING WITH BIOLOGICALLY ACTIVE MATTER

Christof Biebricher, Adelebsen, and Rüdiger Luce, Herzberg, both of Fed. Rep. of Germany, assignors to Max-Planck-Gesellschaft zur Förderung der Wissenschafen e.V., Göttingen, Fed. Rep. of Germany

Filed May 17, 1977, Ser. No. 797,677

Claims priority, application Fed. Rep. of Germany, May 18, 1976, 2621974

Int. Cl.[2] D06M *13/42;* C08B *15/06, 37/02*

U.S. Cl. 8—192 26 Claims

1. In a method for the production of a vehicle substance capable of covalent bonding with a biologically active matter which is synthetized from a vehicle containing preferably several free $-NH_2$ or $-OH$ groups and at least a bonding agent containing at least two reactive groups, the improvement wherein the vehicle under anhydrous conditions is reacted with an excess of organic diisocyanate in an anhydrous organic aprotic solvent in the presence of a strong basic catalyst, and the resultant vehicle substance is isolated in a storable form.

4,177,039

DISPERSANT FOR COAL INTO OILS

Kouhei Sakuma, Tokyo; Toshiyuki Ukigai, Yachiyo; Tatsuji Yamashita, and Osamu Yamaki, both of Chiba, all of Japan, assignors to Lion Yushi Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 27, 1978, Ser. No. 964,266

Claims priority, application Japan, Nov. 29, 1977, 52-143179

Int. Cl.[2] C10L *1/32*

U.S. Cl. 44—51 5 Claims

1. A dispersant for coal into oils which comprises:

(a) a metal salt of a dialkyl sulfosuccinate of the general formula:

$$[R^1O_2C-CH_2-\underset{\displaystyle SO_3}{\underset{|}{CH}}-CO_2R^2]_n \cdot M$$

wherein R^1 and R^2 each represent an alkyl group having at least 4 carbon atoms, n represents an integer of 1~3 and M represents a metal having a valency of n, and

(b) at least one lower aliphatic alcohol selected from the group consisting of a monohydric alcohol having 1~5 carbon atoms, a polyhydric alcohol having 2~5 carbon atoms and an alcohol with 2~5 carbon atoms having an alkoxy group with 1~5 carbon atoms.

4,177,040

STARTER FLUID FOR INTERNAL COMBUSTION ENGINES

Fay E. Kaiser, Jr., Niles, Mich., assignor to U.S. Aviex Corp., Niles, Mich.

Filed Jul. 3, 1978, Ser. No. 921,845

Int. Cl.[2] C10L *1/16*

U.S. Cl. 44—52 3 Claims

1. A starter fluid for internal combustion engines confined in a sealed pressure-charged, valved aerosol type spray container consisting essentially of:

a lower alkyl ether, from 35 to 65% by vol.;

a pressurizing gas from 3 to 5% by vol.;

a hydrocarbon propellant from 4 to 8% by vol.; and

a petroleum distillate of the class consisting of 5 to 8 carbon chains or any isomer thereof, from 36 to 52% by volume.

4,177,041

CARBURETOR DETERGENTS

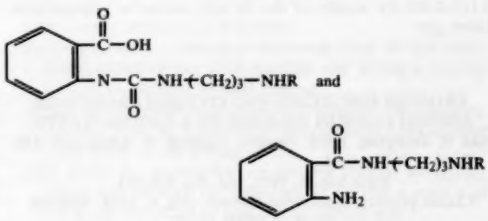
Rodney L. Sung, Fishkill, and Ronald W. Von Allmen, Poughkeepsie, both of N.Y., assignors to Texaco Inc., White Plains, N.Y.

Filed Sep. 22, 1978, Ser. No. 944,938

Int. Cl.[2] C10L *1/22*

U.S. Cl. 44—71 4 Claims

1. A carburetor detergent consisting of a mixture of products of the formulas:



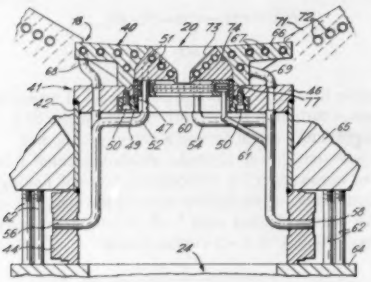
and

wherein R is an alkyl group derived from a fatty acid having from 6 to 18 carbon atoms in the chain.

4,177,042
COAL GASIFICATION PLANT

Andrew Wood, Dunfirmline, Scotland, assignor to British Gas Corporation, London, England

Division of Ser. No. 771,330, Feb. 23, 1977. This application Apr. 3, 1978, Ser. No. 892,969
Claims priority, application United Kingdom, Mar. 22, 1977, 11445/76
The portion of the term of this patent subsequent to Nov. 28, 1995, has been disclaimed.
Int. Cl.[2] C10J 3/72
U.S. Cl. 48—87 6 Claims



1. An annular hearth member for use in a coal slagging gasifier having a slag tap member, said annular hearth member comprising a solid mass of high thermal conductivity material having means defining an integrally formed passageway for circulating a coolant liquid through said mass, the uppermost annular surface of said hearth member sloping downwardly inwardly towards its center, the inner peripheral wall of said hearth member being formed in a surface of revolution whose cross-sectional profile corresponds to the external surface profile of the slag tap member of said slagging gasifier over which slag tap the annular hearth member is sized to be a close fit, and means defining an inlet and outlet communicating said passageway exteriorly of said solid mass.

4,177,043
CHEMICAL TREATMENT FOR IMPROVING ELECTROSTATIC PRECIPITATION OF DUST PARTICLES IN ELECTROSTATIC PRECIPITATORS

Vincent M. Albanese, Lockport, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.

Filed May 22, 1978, Ser. No. 908,313
Int. Cl.[2] B03C 1/00
U.S. Cl. 55—5 2 Claims

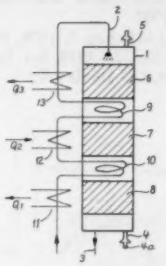
1. A method of improving the conductivity of fly ash particles entrained in a stream of particle-laden gas formed by the burning of coal, which fly ash particles are collected by an electrostatic precipitator which comprises treating said particles prior to their precipitation in an electrostatic precipitator with a treatment chemical comprising ammonium sulfate plus triethylamine sulfate combined in a weight ratio of 0.5–12:1 said treatment chemical being added at a level of from 0.125–2.0% by weight of the fly ash present in said particle laden gas.

4,177,044
PROCESS FOR REMOVING OXYGEN FROM AND ADDING CARBON DIOXIDE TO A LIQUID WATER

Ake S. Jernqvist, Lund, Sweden, assignor to Alfa-Laval AB, Tumba, Switzerland

Filed Sep. 1, 1977, Ser. No. 829,951
Claims priority, application Sweden, Sep. 6, 1976, 7609798
Int. Cl.[2] B01D 19/00
U.S. Cl. 55—48 2 Claims

1. A process for removing oxygen from and adding carbon dioxide to a liquid, such as water, wherein the liquid and a carbon dioxide containing gas are brought into intimate contact with each other during counter-current flow thereof, the process being characterized in that the liquid is caused to flow through a first contact zone at a relatively low tempera-

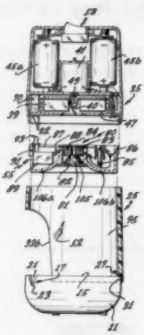


ture t_1 to take up carbon dioxide, then through a second contact zone for delivering carbon dioxide and oxygen to said gas at a higher temperature t_2, and finally through a third contact zone to take up carbon dioxide at a lower temperature t_3 with respect to the temperature t_2.

4,177,045
SELF-ACTING SMOKE SORBING DEVICE

Jeannette V. Orel, 10501 Wilshire Blvd., Los Angeles, Calif. 90024

Filed Jul. 10, 1978, Ser. No. 923,100
Int. Cl.[2] B03C 3/36, 3/38; B01D 50/00
U.S. Cl. 55—102 4 Claims



1. A self activating smoke sorbing and filtering device comprising:

an ashtray including a wall terminating in a rim for supporting an object having a smoke producing end, such as a cigarette or the like, such that the smoke producing end is positioned within the ashtray,

a shroud contacting the wall of the ashtray, said shroud including wall means extending above the ashtray and operative to confine within the shroud the smoke produced by the object positioned within the ashtray and including an aperture in the upper end of said shroud,

said shroud having an opening in the wall means thereof such that the shroud contacts only a portion of the wall of the ashtray such that the smoke producing object may be inserted through the opening to rest within the ashtray,

said opening defining spaced side walls of the shroud which are recessed back to expose a portion of the rim of the ashtray forward of said side walls,

housing means supported solely by said shroud,

said housing means having an opening generally vertically

above the ashtray and said opening being in communication with said aperture,

said housing means including a discharge opening spaced from said opening of said housing means and cooperating with said opening in the wall means to form a passageway extending into said housing means from the outside environment,

power driven air moving means supported within said housing means and on said shroud and positioned over said opening in said housing means and within said passageway for drawing air through the opening in the wall means of said shroud and into said passageway for discharge through the opening in said housing means through the remainder of said passageway and through the discharge opening and into the environment, the movement of air through said shroud being operative to carry with it the smoke produced by said object within the confines of the shroud,

detection means supported inside said shroud and contiguous to said housing means coupled electrically to said power driven air moving means for detecting smoke and purifying air, said means, on sensing said smoke, being operative to concurrently separate said smoke from said air and energize said air moving means for drawing the smoke and air through said passageway and said detection means and propelling the purified air into the environment, and,

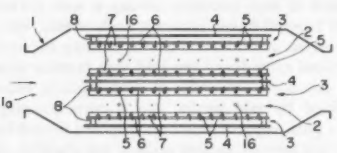
filter means supported within said housing means and radially outward of said air moving means above said detection means for filtering the once-purified air drawn through said passageway by said power driven air moving means.

4,177,046

AC TYPE DUST COLLECTING APPARATUS

Toshio Moriyama, 14-10, Eifuku 1-chome, Suginami-ku, Tokyo-to, Japan

Filed Aug. 30, 1978, Ser. No. 937,986
Int. Cl.[2] B03C *3/04, 3/47*
U.S. Cl. 55—123 **1 Claim**



1. An AC type dust collecting apparatus comprising: a plurality of discharge electrodes; and a dust collecting electrode assembly, said dust collecting electrode assembly having a grounded dust collecting plate and a plurality of grid elements which are electrically insulated from said dust collecting plate, said grid elements being J-shaped in section and being arranged in spaced, parallel relationship with one another and with said dust collecting plate, with the curved portion of each J-shaped grid element faced towards said plurality of discharge electrodes and with the open edges of each grid element faced towards said dust collecting plate, an AC power source connected to said discharge electrodes to apply alternating current to said discharge electrodes.

4,177,047

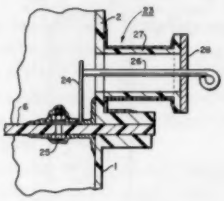
ELECTROSTATIC PRECIPITATORS

Yaacov Goland, Pacific Palisades, Calif., assignor to Joy Manufacturing Company, Pittsburgh, Pa.

Filed Jul. 27, 1978, Ser. No. 928,766
Int. Cl.[2] B03C *3/49, 3/64*
U.S. Cl. 55—146 **11 Claims**

1. An electrostatic precipitator comprising a casing made of corrosion resistant material and having a gas inlet and a gas outlet, a plurality of collecting electrodes, and a plurality of high-voltage electrodes, each of said collecting electrodes being made of an insulating resin reinforced with fiberglass and having an integral conductive surface layer on its collecting surface, said surface layer consisting of a layer of said resin containing graphite powder and at least one graphite veil substantially coextensive with the surface.

11. A collecting electrode adapted for use in conjunction with a high voltage electrode of an electrostatic precipitation apparatus to maintain an electrical field which is effective for electrostatic precipitation of contaminants from a flow of gas



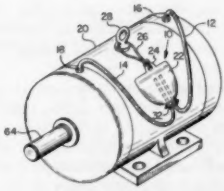
processed through such electrostatic precipitation apparatus, said collecting electrode comprising: an electrode body member formed to cooperate with such high voltage electrode to maintain such electrical field; said body member including a layer of insulating resin reinforced with fiberglass and having an integral conductive layer formed on the surface thereof with said conductive layer including a collecting surface on which such contaminants accumulate during electrostatic precipitation operations; and said conductive layer consisting of a layer of insulating resin containing graphite powder and at least one graphite veil substantially coextensive with said collecting surface.

4,177,048

BEARING BREATHER DESICCANT DEVICE

Morris R. Rivers; Ralph G. Osterman, both of Vancouver, Wash., and George H. Warmuth, Portland, Oreg., assignors to Georgia-Pacific Corporation, Portland, Oreg.

Continuation of Ser. No. 767,373, Feb. 10, 1977, abandoned.
This application May 26, 1978, Ser. No. 910,026
Int. Cl.[2] B01D *39/00;* **H02K** *5/16*
U.S. Cl. 55—275 **16 Claims**



1. Rotor bearing apparatus, including bearing breather, comprising:

rotor means mounted on bearings;

housing means containing at least a portion of said rotor means including the rotor bearings and having a bearing lubrication passage for said bearings;

drying means containing a desiccant material for removing moisture from air transmitted therethrough from an inlet to an outlet of the drying means;

inlet means for transmitting air into the inlet of the drying means and through the desiccant to provide a source of dry air at the outlet of said drying means; and

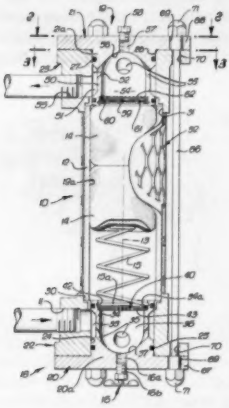
output means for transmitting said dry air from the outlet of said drying means through said lubrication passage to the rotor bearings to supply said dry air to said bearings.

4,177,049

COMPRESSED GAS FILTER

John A. Haslett, Jr., San Marino, Calif., assignor to Flo Dri Company, Los Angeles, Calif.

Filed Nov. 25, 1977, Ser. No. 854,838
Int. Cl.[2] B01D *25/06, 27/02, 29/24, 29/14*
U.S. Cl. 55—483 **11 Claims**



1. In a filter assembly to remove impurities from a pressurized fluid stream, the combination comprising:

(a) a longitudinally elongated barrel, first and second end structures at opposite ends of the barrel, said structures including end caps, and elongated tie members spaced about the barrel and removably interconnecting said end caps,

(b) there being flexible container means in the barrel containing fluid stream filtering material, and a spring located within the barrel between one of said end structures and said flexible container means to pressurize the latter for expanding same sidewardly against the barrel, and

(c) the first end structure containing a fluid inlet and an annular plenum communicating with said inlet, said first end structure having an annular wall extending about a cavity in endwise longitudinal alignment with the barrel interior, said plenum extending about said wall which contains multiple through openings angled to pass pressurized fluid from the plenum to the cavity in streams which are caused to impinge upon one another and turbulently mix together to detrain liquid and solid impurities from the fluid streams prior to flow thereof through the filter material in the barrel,

(d) said first end structure end cap forming a concave interior wall facing toward said spring, said cavity being interiorly open to facilitate said turbulent mixing interiorly of the cavity, said openings in said annular wall angled transversely and longitudinally toward said concave interior wall and in direction away from the spring, the spring spaced from the cavity, there being a perforated filter plate extending across the end of the open cavity opposite said concave interior wall, the spring located at the side of said plate opposite the cavity, and

(e) the second end structure defining a fluid outlet communicating with the barrel to receive fluid that has passed through said filtering material,

(f) said spring comprising a coil spring having a lowermost turn adjacent said filter plate, the spring located between said cap and said filter material container means, there also being liquid coalescing filter means extending parallel to and proximate said filter plate at a level above the level of the openings,

(g) said first openings in said annular wall being angled to extend transversely inwardly and downwardly generally tangentially relative to and toward said concave interior wall, said wall being upwardly concave so that liquid impurities drain toward the lowermost extent of said wall, there being a drain opening through said cap proximate the lowermost extent of said wall, and a drain valve controlling said drain opening,

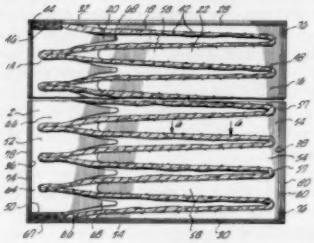
(h) and including a safety cage surrounding said barrel to protect against inadvertent bursting thereof.

4,177,050

AIR FILTER ASSEMBLY

Robert M. Culbert, Manhattan Beach, and Robert R. Raber, Jr., Los Alamitos, both of Calif., assignors to Farr Company, Los Angeles, Calif.

Continuation of Ser. No. 716,644, Aug. 23, 1976, abandoned.
This application May 5, 1978, Ser. No. 903,204
Int. Cl.[2] B01D *46/02*
U.S. Cl. 55—499 **3 Claims**



2. A filter assembly comprising an open ended housing defining an inlet end and an outlet end for the passage of air therethrough, a continuous length of high loft filtering media disposed within said housing and extending between opposite side walls thereof and a pleated configuration wherein each of the pleats defined by said media extends substantially from said inlet to said outlet end of said housing, a first plurality of pleat support members disposed in said housing at said inlet end thereof, each of said members having a web portion and a plurality of tapered finger portions, each of said web portions extending across said inlet end of said housing and each of said finger portions extending from said web portion along a first radius of curvature inwardly of said housing between the pleats defined by said media, and a corresponding second plurality of pleat support members disposed in said housing at said outlet end thereof, each of said second plurality of support members having a web portion and a plurality of tapered finger portions, each of said web portions extending across said outlet end of said housing and each of said finger portions extending from said web portions along a second radius of curvature inwardly of said housing between said pleats, said second radius of curvature being larger than said first radius of curvature and said first and second pluralities of pleat members defining a segmented inclined support surface pressing against said filtering media and maintaining said media configuration upon directing a flow of air through said housing.

4,177,051

METHOD AND APPARATUS FOR SEPARATION, REFINEMENT, EXTRACTION AND/OR CONCENTRATION BY LIQUATION

Clyde M. Adams, Jr., 3509 Biddle St., Cincinnati, Ohio 45220

Filed Feb. 28, 1978, Ser. No. 882,256
Int. Cl.[2] B01D *9/04*
U.S. Cl. 62—532 **4 Claims**

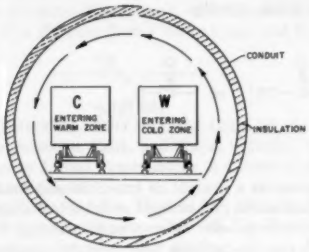
1. A process for separation of a substantially liquid mixture containing solvent and dissolved and/or undissolved foreign matter comprising the steps of:

cooling separate mixtures by moving them in opposite directions through a substantially closed environment at a

controlled and very slow rate of freezing sufficient to produce large plate-like crystals of substantially pure solvent, with counter-flow heat transfer being effected, respectively, between relatively warmer and cooler mixtures passing in opposite directions;

said cooling step being effected with the original mixtures constantly maintained in a substantially quiescent, undisturbed state;

raising the temperature of the combination of crystals and



intercrystalline matter rich in solute, resulting from said cooling of each mixture, at a controlled and very low rate of heat absorption said mixture being conveyed in containers past stationary zones in said closed environment wherein said cooling and heating steps take place;

effecting removal of liquid rich in solute from spaces between said crystals during said step of raising temperature; and

recovering the relatively pure solvent produced by continued heating and melting of said liquid crystals.

4,177,052

PROCESS FOR PREPARING DICALCIUM PHOSPHATE CONTAINING FERTILIZER

Karl Entzmann, A-8672 St. Kathrein, Austria; György Kálmán, Ságvári endre u. 15., Tatabánya I., Hungary; János Varga, Kolbai k. u. 4., Mosonmagyaróvár, Hungary; Vecsei Miklós, Terffy Gy. u. 34., Komárom, Hungary; Gabor Jankovics, Ifjumunkás u. 29., Tatabánya v., Hungary, and Lászlóné Kozicz, Mártirok u. 86., Tatabánya, Hungary

Filed May 5, 1978, Ser. No. 902,931

Claims priority, application Hungary, May 6, 1977, TA 1439

Int. Cl.[2] C05B *3/00*

U.S. Cl. 71—33 **9 Claims**

1. A process for preparing a fertilizer containing dicalcium phosphate from a tricalcium phosphate of mineral origin, said preparing being in the presence of monocalcium phosphate, which process comprises granulating the grains of the sized or unsized phosphate of mineral origin which are larger than 5 mm to a grain size of 1 to 4 mm, admixing the mineral phosphate with monocalcium phosphate and activating the phosphate crystals such that defects are formed in the crystal lattice of the resulting phosphate by colliding the grains of the mixture with each other at a speed of 70 to 120 m/sec for a time sufficient to prepare said fertilizer containing dicalcium phosphate.

4,177,053

METHOD FOR THE PRODUCTION OF PHOSPHORIC ACID WITH HIGH CONTENTS OF FERTILIZER-NUTRIENTS

Hans-Friedrich Kurandt, Lüneburg, Fed. Rep. of Germany, assignor to Veba-Chemie Aktiengesellschaft, Gelsenkirschen-Buer, Fed. Rep. of Germany

Continuation of Ser. No. 513,982, Oct. 11, 1974, abandoned. This application Jul. 6, 1976, Ser. No. 703,034

Claims priority, application Fed. Rep. of Germany, Oct. 11, 1973, 2351031; Mar. 15, 1974, 2412503

Int. Cl.[2] C05B *11/06*

U.S. Cl. 71—36 **16 Claims**

1. A process for decomposing phosphate rock with nitric acid in order to produce phosphoric acid having a high fertilizer-nutrient content and as a by-product a well filterable semihydrate of calcium sulfate which consists essentially of:

(A) decomposing phosphate rock having a P_2O_5 content up to 40% by weight

(B) with nitric acid, the amount of acid adjusted to a molar ratio of $H^+:P_2O_5$ equal to or greater than 7 but less than or equal to 17 and

(C) adjusting the water content of the decomposing mixture such that the produced nitrogen-containing phosphoric acid has a water content of 20 to 55% by weight, recycling amounts of wash water from step (G);

(D) adjusting the sulfate ion content so that there are at least 10 and up to 150 g free sulfate ions per liter of solution;

(E) agitating the resulting slurry thereby effecting precipitation and recrystallization of calcium ions as well as filterable calcium sulfate semihydrate;

(F) separating said well filterable calcium sulfate semihydrate from supernatant liquid;

(G) washing the separated calcium sulfate semihydrate with wash water and recycling at least a portion of such wash water to step (C) to adjust the water content thereof; and

(H) recovering as the liquid a nitrogen-containing phosphoric acid.

11. A process for decomposing phosphate rock with nitric acid of 35 to 60% HNO_3 by weight to produce phosphoric acid having a high fertilizer-nutrient content and as by-product a well filterable semihydrate of calcium sulfate which consists essentially of:

(A) decomposing phosphate rock having a P_2O_5 content up to 40% by weight

(B) with nitric acid in the absence of sulfuric acid, the amount of acid adjusted to a molar ratio of $H^+:P_2O_5$ equal to or larger than 7 but less than or equal to 17;

(C) adjusting the resulting decomposition solution to an actual nitric acid content of 35 to 60% by weight;

(D) adding sulfate in the form of ammonium sulfate or potassium sulfate such that the sulfate ion is present in an amount of at least 10 to up to 150 g free sulfate ions per liter solution;

(E) agitating this slurry whereby under the conditions of temperature and concentration recrystallization of substantially all calcium ions is effected together with precipitation of a well filterable calcium sulfate semihydrate;

(F) separating said well filterable calcium sulfate semihydrate from supernatant liquid;

(G) washing said well filterable calcium sulfate semihydrate with water and employing the resultant wash water in step (C) to adjust the nitric acid concentration in step (C); and

(H) recovering as liquid phase of the process a nitrogen-containing phosphoric acid.

4,177,054
1,2,3-THIADIAZOLE-5-CARBOXYLIC ACID DERIVATIVES, HERBICIDAL AND GROWTH REGULATING COMPOSITIONS CONTAINING THE SAME AND PROCESS FOR MAKING SAME

Friedrich Arndt; Hans-Rudolf Krüger, and Reinhart Rusch, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

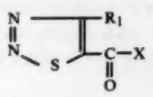
Filed Jun. 23, 1978, Ser. No. 918,462

Claims priority, application Fed. Rep. of Germany, Jun. 23, 1977, 2728523

Int. Cl.[2] **C07D** *285/06;* **A01N** *9/12*

U.S. Cl. 71—90 **66 Claims**

1. A comound of the formula



I

wherein

R_1 is hydrogen, C_1–C_4 alkyl, chloromethyl, or bromomethyl; and

X has the formula

where R_3 and R_4 are the same or different and are hydrogen, C_1–C_{18} alkyl, mono- or disubstituted C_1–C_{18} alkyl substituted in the 1-, 2- or 3-position by halogen, C_1–C_6 alkoxy, phenoxy, dimethylamino, diethylamino, methoxycarbonyl, ethoxycarbonyl or cyano, tetrahydrofurfuryl, C_3–C_8 cycloalkylmethyl, C_2–C_8 2- or 3-alkenyl or alkinyl, phenyl or diphenyl C_1–C_3 alkyl, mono- or disubstituted benzyl substituted by one or more of halogen, methylenedioxy, C_1–C_6 alkyl, C_1–C_6 alkoxy, trifluoromethyl or nitro, α-methyl- or α,α-dimethylbenzyl, pyridyl, furfuryl, C_3–C_8 cycloalkyl, C_1–C_6 alkyl or ethinyl substituted C_3–C_8 cycloalkyl, phenyl, mono- or disubstituted phenyl substituted by one or more of halogen, methylenedioxy, C_1–C_6 alkyl, C_1–C_6 alkoxy, trifluoromethyl or nitro, or naphthyl, or R_3 and R_4 together with the adjoining nitrogen atom constitute a morpholine, piperidine or pyrrolidine group.

2. A herbicidal and growth regulating composition for plants comprising about 10 to 80% by weight of the active agent defined in claim 1 and about 90 to 20% by weight of liquid or solid carrier materials in which composition part of the carrier materials may be replaced by up to 20% by weight of surface active agents.

4,177,055
1-ACYLOXYMETHYL-4,5-DICHLORO-IMIDAZOLE-2-CARBOXYLIC ACID DERIVATIVES AND THEIR USE AS PLANT PROTECTION AGENTS

Florin Seng; Klaus Sasse, both of Berg. Gladbach; Gunther Beck; Ludwig Eue, both of Leverkusen, and Robert R. Sch[illegible]t, Cologne, all of Fed. Rep. of Germany, assignors t[illegible] B[illegible] Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

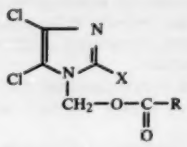
Filed Sep. 21, 1977, Ser. No. 835,093

Claims priority, application Fed. Rep. of Germany, O[illegible]1, 1976, 2646142

Int. Cl.[2] **C07D** *233/68;* **A01N** *9/22*

U.S. Cl. 71—92 **17 Claims**

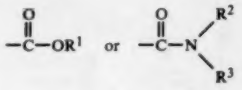
1. A 1-acyloxymethyl-4,5-dichloro-imidazole-2-carboxylic acid derivative of the formula



(I)

in which

X represents a group



in which

R^1 represents a straight or branched alkyl radical of 1 to 6 carbon atoms or a straight or branched alkenyl or alkynyl radical each with up to 6 carbon atoms, which radicals each can be carrying one or more substituents selected from halogen, alkoxy with 1 to 6 carbon atoms and alkylmercapto with 1 to 6 carbon atoms,

R^2 represents hydrogen, alkyl with 1 to 8 carbon atoms, alkenyl with up to 8 carbon atoms or the formyl group,

R^3 represents alkyl with 1 to 8 carbon atoms or alkenyl or alkynyl each with up to 8 carbon atoms, it being possible for each of these alkyl, alkenyl and alkynyl radicals to carry one or more substituents selected from alkoxy with 1 to 4 carbon atoms, alkylmercapto with 1 to 4 carbon atoms, or

R^2 and R^3 conjointly with the adjoining nitrogen atoms form a heterocyclic ring selected from pyrrolidinyl, piperidinyl and hexamethyleneimidinyl and

R represents alkyl with 1 to 6 carbon atoms.

4,177,056
WATER-INSOLUBLE HYDROPHILIC COPOLYMERS USED AS CARRIERS FOR MEDICAMENTS AND PESTICIDES

Karl F. Mueller, New York, and William R. Good, Yorktown Heights, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 581,065, May 27, 1975, abandoned, which is a continuation-in-part of Ser. No. 483,743, Jun. 27, 1974, abandoned. This application Jan. 25, 1978, Ser. No. 872,191

Int. Cl.[2] **A01N** *9/22;* **A61K** *31/78*

U.S. Cl. 71—93 **20 Claims**

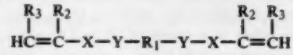
1. A controlled, sustained release composition comprising

(a) a pharmaceutically, insecticidally or herbicidally effective agent in an amount at least sufficient for the total dosage during a treatment period, and

(b) a water-insoluble hydrophilic gel comprising the cross-linked copolymerization product of

(A) about 30 to about 90% by weight of said gel of (a) a water-soluble monoolefinic monomer, or mixture of said monomers, or (b) a water-soluble monomer, or mixture of said monomers with 1 to 50% by weight of total monomers of a water-insoluble monoolefinic monomer, or mixture of said water-insoluble monomers, with

(B) about 10 to about 70% by weight of said gel of a terminal diolefinic hydrophobic macromer having a molecular weight from about 400 to about 8000, said macromer having the formula



wherein R_1 is a polycondensate chain having a molecular

weight from about 200 to about 8000, which is the residue of a poly(propylene oxide) or poly(tetramethylene oxide) glycol having ether linkages; R_2 is hydrogen, methyl or —CH_2COOR_4, wherein R_4 is hydrogen or an alkyl group with up to 10 carbon atoms; R_3 is hydrogen or $COOR_4$, with the proviso that at least one of R_2 and R_3 is hydrogen; X is oxa,—COO—, or —$CONR_5$—wherein R_5 is hydrogen or alkyl with up to 5 carbon atoms and Y is a direct bond or the radical —R_6—Z_1—CO—NH—R_7—NH—CO—Z_2—, wherein R_6 is linked to X and represents branched or linear alkylene with up to 7 carbon atoms; Z_1 and Z_2 is oxa or NR_5 and R_7 is the diradical of aliphatic or aromatic diisocyanate, with the proviso that in case X is oxa, Y is different from a direct bond, and R_2 and R_3 are hydrogen.

4,177,057

HERBICIDAL BENZIMIDAZOLES

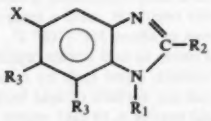
Don L. Hunter, Anaheim, Calif., and Wayne S. Belles, Moscow, Id., assignors to United States Borax & Chemical Corporation, Los Angeles, Calif.

Continuation-in-part of Ser. No. 844,777, Oct. 25, 1977, abandoned. This application Jun. 19, 1978, Ser. No. 916,669

Int. Cl.² A01N *9/22*

U.S. Cl. 71—92 **13 Claims**

1. The method for controlling weed growth which comprises applying to the locus of said weeds a phytotoxic amount of a compound of the formula



in which each of R_1 and R_2 are lower alkyl of one to about three carbon atoms, X represents a lower alkylsulfonyl or fluoro-lower alkylsulfonyl group and each of said R_3's is selected from hydrogen, halo, lower alkoxy, nitro and amino groups.

4,177,058

METHOD FOR PRODUCING A NON-SPLIT METAL WORKPIECE FORMED AS A CAST HOLLOW BILLET WITH A BOTTOM PART

Boris E. Paton; Boris I. Medovar, both of Kiev; Georgy E. Tsukanov, Moscow; Alexei G. Bogachenko, Kiev; Viktor L. Artamonov, Kiev; Grigory A. Timashov, Kiev; Jury P. Shtanko, Kiev; Alexandr M. Marchenko, Kiev; Boris B. Fedorovsky, Kiev; Ilya I. Kumysh, Kiev; Anatoly D. Chepurnoi, Zhdanov Donetskoi oblasti; Vladimir Y. Saenko, Kiev, and Gennady M. Semin-Vsdov, Moscow, all of U.S.S.R., assignors to Institut Elektrosvarki Imeni E.O. Patona Akademii Nauk Ukrainskoi SSR, Kiev, U.S.S.R.

Filed Oct. 26, 1977, Ser. No. 845,679

Claims priority, application U.S.S.R., Sep. 22, 1977, 2520640

Int. Cl.² C22B *4/00*; B22D *27/02*

U.S. Cl. 75—10 C **15 Claims**

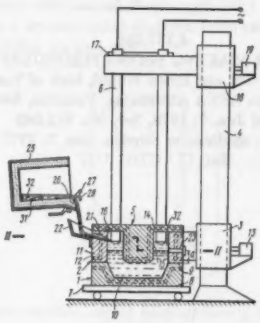
1. A method of producing a metal workpiece having an upper part and a lower base part comprising the steps of:

premelting a metal having the same composition as that specified for the metal of the base part of said workpiece being produced in an amount determined by the mass of metal of the base part of the workpiece;

premelting slag in an amount sufficient to form a slag pool;

pouring the molten slag and molten metal into a receptacle, the molten slag forming a slag pool on top of the molten metal and the molten metal solidifying to produce the base part;

electroslag remelting at least one consumable electrode in the slag pool to produce the upper part, the composition of said electrode being the same as that specified for the metal of the upper part of the workpiece being produced,



the mass of the electrode being sufficient to form the upper part of the workpiece being produced.

4,177,059

PRODUCTION OF YTTRIUM

Joseph G. Day, Holmer Green, England, assignor to Johnson, Matthey & Co., Limited, London, England

Filed Jul. 5, 1978, Ser. No. 922,194

Claims priority, application United Kingdom, Jul. 5, 1977, 28072/77

Int. Cl.² C22B *4/04*

U.S. Cl. 75—10 R **6 Claims**

1. A process for the production of yttrium metal and alloys thereof in which calcium metal and yttrium fluoride are reacted together by the use of electric resistance heating in a molten slag which contains the calcium metal, the yttrium fluoride and a preponderant amount of calcium fluoride.

4,177,060

REDUCTION OF STABLE OXIDES

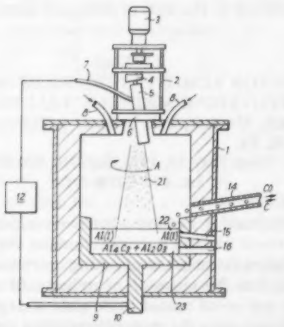
Józef K. Tylko, Faringdon, England, assignor to Tetronics Research & Development Company Limited, Faringdon, England

Filed Aug. 22, 1977, Ser. No. 826,695

Claims priority, application United Kingdom, Aug. 23, 1976, 35076/76

Int. Cl.² C22B *21/02*

U.S. Cl. 75—10 R **9 Claims**



1. A process for the carbothermal reduction of alumina comprises supplying a feed of alumina and carbon to a molten reaction bed maintained in a reaction chamber, exhausting evolved gases from said reaction chamber and supplying energy to said reaction bed by contacting said bed with plasma or plasma effluents derived from at least one plasma gun orbiting

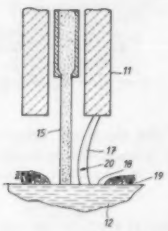
about the vertical axis of the reaction chamber and generating plasma within an essentially conoidal zone within said reaction chamber.

4,177,061

METHOD FOR MAKING IRON-CHROMIUM ALLOYS

Sven-Einar Stenkvist, and Björn Widell, both of Vesteras, Sweden, assignors to ASEA Aktiebolag, Vesteras, Sweden

Filed Jun. 7, 1978, Ser. No. 913,040
Claims priority, application Sweden, Jun. 9, 1977, 7706700
Int. Cl.² C21C 5/52
U.S. Cl. 75—11 **4 Claims**



1. A method for making an iron-chromium alloy in an electric arc furnace having a hearth, side wall and arcing electrode; said method comprising charging the furnace with carbon-containing steel scrap so as to form a pile of the scrap on the hearth, applying DC power to the electrode and pile with the electrode cathodic and the pile anodic and forming an arc between the electrode's tip and the pile to start melting the scrap with the arc initially between said tip and the top of the pile and with melting of the scrap the arc and tip boring down into the pile with the scrap surrounding the arc and forming a shield absorbing the radiated arc energy so as to protect the furnace's side wall from said energy, said arc forming an arc spot on the forming melt resulting from said melting and said power being adjusted to a high value causing the arc to rapidly melt the scrap after said shield is formed and until a time when said shield ultimately is reduced to ineffectiveness by continued melting of the scrap, and not later than when said time occurs continuing said power at said high value while protecting the furnace's side wall by absorbing the arc energy by continuously feeding particulated chromium oxide to said arc spot so as to reduce said oxide by endothermic reaction with carbon contained by the melt via the scrap's carbon and so as to add chromium to the melt to form said alloy.

4,177,062

METHOD FOR REMOVING OIL FROM MILL SCALE AND RECOVERING METALLIC VALUES THEREIN

Paul R. Pack, Munster, Ind., assignor to Harsco Corporation, Camp Hill, Pa.

Filed May 23, 1978, Ser. No. 908,894
Int. Cl.² C21B 3/04
U.S. Cl. 75—28 **17 Claims**

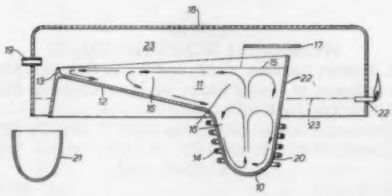
1. In a steelmaking method wherein an initial ore charge is smelted to crude iron in a reduction furnace, the smelted product is refined into steel in a steelmaking operation, the resulting steel is rolled in the presence of rolling mill oil to produce rolled steel and an oil coated oxide scale is stripped from said rolled steel; including the steps of separating the hot slag produced in said steelmaking operation from said steel and processing and recycling said slag for recovery of metallic values contained therein, the improvement comprising contacting said stripped oil coated oxide scale with said separated hot slag at a temperature above the ignition temperature of the oil whereby the oil is ignited and substantially completely flashed away, the said de-oiled oxide scale reporting to said slag for processing and recycling to recover metallic values contained therein.

4,177,063

METHOD AND APPARATUS FOR REDUCING METAL OXIDE

Eric W. Dickson, Taunton, England, assignor to The Glacier Metal Company Limited, Middlesex, England

Filed Mar. 17, 1978, Ser. No. 887,515
Claims priority, application United Kingdom, Mar. 16, 1977, 11020/77
Int. Cl.² C21C 7/00
U.S. Cl. 75—62 **9 Claims**



1. A method of reducing metal oxide on the surface of a bath of molten metal, wherein the geometry and the heat source in said bath are arranged so as to create a temperature difference on the surface of said bath comprising a first hotter region A and a second cooler region B, with a temperature difference between said regions of about 500°–700° C., which comprises

supplying metal oxide to said hotter region A,

circulating the molten metal bath by means of convection currents so that the surface of said bath moves continuously from said region A to said region B, thereby

carrying said metal oxide continuously on the surface of said bath from said region A to said region B,

contacting the surface of said bath with a reducing atmosphere, thereby reducing said continuously moving metal oxide to metal, and

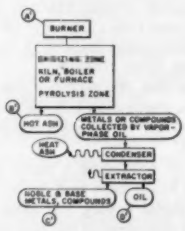
removing metal at said region B by means of a lip present in said bath.

4,177,064

METAL RECOVERY PROCESS AND METHOD

Fritz W. Wanzenberg; Frederick W. Wanzenberg, and Andrew K. Wanzenberg, all of 9 Campbell La., Larchmont, N.Y. 10538

Filed Apr. 9, 1977, Ser. No. 783,846
Int. Cl.² C22B 11/00
U.S. Cl. 75—83 **9 Claims**



1. A method of treating solid materials recovered by mining, said solid mined materials including oil shale, low grade coal, and mixtures thereof, said mined materials being comprised of a first, refractory, inorganic ore gangue portion, a second, hydrocarbon portion and a third, composite organic portion, said third portion containing recoverable precious and semi-precious metal values, said method being adapted to recover said metal values from said third portion and to create heat by

combustion of at least parts of said second and third portions, said method comprising physically reducing the particle size of said mined material, separating said third composite organic portion from said gangue portion to form a concentrate of said third, metal-containing organic material, treating said metal-containing organic concentrate portion with both an aqueous solution of a strong oxidizing agent and gas phase oxygen in a combined amount sufficient to supply the stoichiometric amount of oxygen required to fully oxidize said composite material, thereby producing a treated composite organic concentrate material, heating said treated composite organic material until said material ignites, and allowing complete combustion of said treated composite organic material and a portion of said hydrocarbon material recovering the metal and metal oxides resulting from said combustion, and generating significant useable heat from the process of combustion of said second and third materials.

4,177,065

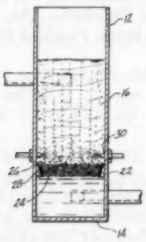
METHOD FOR THE DEGASSING AND FILTRATION OF MOLTEN METAL

Joseph A. Clumpner, Creve Coeur, Mo., assignor to Swiss Aluminium Ltd., Chippis, Switzerland

Division of Ser. No. 914,511, Jun. 12, 1978. This application Jan. 12, 1979, Ser. No. 2,843

Int. Cl.[2] C22B *9/02, 9/08*

U.S. Cl. 75—93 E **3 Claims**



1. A method for the degassing of molten metal by passing said molten metal through a chamber and purging said molten metal with a fluxing gas by passing said fluxing gas through said metal, the improvement comprising providing a chamber having an elongated side wall portion, providing said chamber with molten metal inlet means at a first height, molten metal outlet means at a second height below said first height and fluxing gas inlet means at a third height below said first height, tangentially positioning said molten metal inlet means with respect to said side wall portion such that said molten metal swirlingly flows in a clockwise or counterclockwise manner from said molten metal inlet to said molten metal outlet as said fluxing gas percolates through said molten metal.

4,177,066

METHOD AND APPARATUS FOR THE REMOVAL OF IMPURITIES FROM MOLTEN METAL

Joseph A. Clumpner, Creve Coeur, Mo., assignor to Swiss Aluminium Ltd., Chippis, Switzerland

Continuation-in-part of Ser. No. 914,511, Jun. 12, 1978. This application Feb. 21, 1979, Ser. No. 13,029

Int. Cl.[2] C22B *9/02, 9/08*

U.S. Cl. 75—93 E **30 Claims**

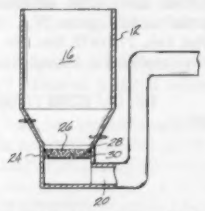
1. An improved apparatus for use in the degassing of molten metal which comprises:

chamber means having an elongated side wall portion and a central axis;

inlet means at a first height for introducing said molten metal into said chamber;

outlet means at a second height below said first height for removing said molten metal from said chamber;

at least two fluxing gas inlet means located below said first height for introducing said fluxing gas into said chamber, said first fluxing gas inlet means being located at a first radial distance from said central axis of said chamber means and said second fluxing gas inlet means being located at a second radial distance from said central axis of said chamber means; and



wherein said molten metal inlet means is located with respect to said side wall portion for tangentially introducing said molten metal into said chamber such that said molten metal swirlingly flows from said molten metal inlet towards said molten metal outlet as said fluxing gas percolates up through said molten metal.

4,177,067

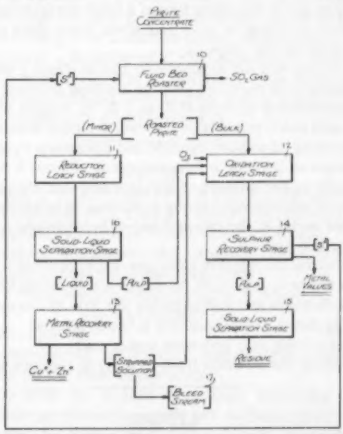
RECOVERY OF SILVER, COPPER AND ZINC FROM PARTIALLY ROASTED PYRITE CONCENTRATE BY FERRIC SULPHATE LEACHING

Terry W. Pepper, Golden, and Harry G. Boccking, Lakewood, both of Colo., assignors to Texasgulf Inc., Stamford, Conn.

Filed Apr. 17, 1978, Ser. No. 897,016

Int. Cl.[2] C22B *11/06, 15/08, 13/04*

U.S. Cl. 75—104 **14 Claims**



1. A process for the recovery of silver, copper and zinc from a pyrite concentrate, comprising the steps of:

(a) partially roasting the pyrite concentrate to open the pyrite matrix to solution penetration by driving off a portion of the sulphur contained therein;

(b) leaching under oxidizing conditions the bulk of the roasted pyrite concentrate to extract the silver, copper and zinc from therein;

(c) cooling the oxidation leached pulp and recovering the elemental sulphur generated during the leaching;

(d) heating the elemental sulphur pellets to recover silver and the portion of the copper and zinc contained therein;

(e) subjecting the solution resulting from the oxidation leach, containing the copper and zinc metals to a reduction leach stage wherein ferric ions contained therein are reduced to ferrous ions; and

(f) introducing the reduced solution from said reduction stage to a metal recovery stage wherein the copper and zinc are recovered therefrom.

4,177,068

EXTRACTION OF GOLD AND SILVER

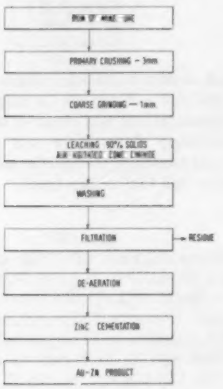
Ramachandran Balakrishnan, Reading, and Geoffrey F. Skinner, Maidenhead, both of England, assignors to Foster Wheeler Energy Corporation, Livingston, N.J.

Filed Feb. 27, 1978, Ser. No. 881,335

Claims priority, application United Kingdom, Mar. 4, 1977, 9230/77

Int. Cl.[2] **C22B** *11/08*

U.S. Cl. 75—105 **8 Claims**



1. A process for the extraction of a noble metal selected from the group consisting of gold and silver from their respective ores comprising the steps of:

(a) reducing said ore to a particle size of about 1 mm or less,

(b) mixing said particles with an alkaline solution having a concentration of from 0.10 to 5% by weight of lixiviant for said noble metal such lixiviant selected from the group consisting of sodium cyanide and potassium cyanide in an amount to provide a liquor content of from 8 to 12% by weight of the mixture of lixiviant and ore, the concentration of said lixiviant being sufficient to solubilize all said noble metal in the ore and any other lixiviant consuming materials present,

(c) allowing the mixture from step (b) to react in a static bed at a temperature of 10° to 40° C. for a period between 12 and 48 hours and sufficient for the lixiviant to extract said noble metal, while said bed is being aerated,

(d) reslurrying said bed with water, and

(e) filtering the solution from step (d) to recover said metal.

4,177,069

PROCESS FOR MANUFACTURING SINTERED COMPACTS OF ALUMINUM-BASE ALLOYS

Mituki Kobayashi; Takao Awao; Yujiro Mizusaki; Kunio Sato; Akio Kato, all of Kawahigashimura, and Hisao Mituishi, Tokyo, all of Japan, assignors to Showa Denko K.K., Tokyo, Japan

Filed Apr. 3, 1978, Ser. No. 892,740

Claims priority, application Japan, Apr. 9, 1977, 52-40827; Apr. 9, 1977, 52-40828

Int. Cl.[2] **B22F** *1/00*

U.S. Cl. 75—213 **15 Claims**

1. Process for manufacturing sintered compacts of aluminum-base alloys comprizing a step of mixing at least one powder selected from the first group consisting of aluminum powder and powder of Al-Si alloy containing Si at the most of 2.1% by weight with at least one powder selected from the second group consisting of powders of Al-Cu-Mg-Si alloy, Al-Cu-Si alloy, Al-Mg-Si alloy, Cu-Mg-Si alloy, Al-Cu-Mg alloy, Al-Cu alloy, Al-Mg alloy, Mg-Cu alloy, Cu and Mg in such a mixing proportion, that the over-all composition of the resulting powder mixture will correspond to the figures

Cu 1.0~6.0% by weight

Mg 0.2~2.0% by weight

Si 0.2~2.0% by weight

Al Rest

and wherein the powder of said first group will amount to at least 70%, based on the total weight of the resulting powder mixture; a step of compacting the resulting powder mixture into predetermined shapes to obtain green compacts and a step of sintering the green compacts at a temperature of from 500° to 650° C. in the air.

4,177,070

EXOTHERMIC SLAG-FORMING MIXTURE

Leonid I. Krupman, ulitsa R. Ljuxemburg 30a, kv. 17; Jury G. Yaroslavtsev, prosperkt Ilicha 10, kv. 15; Alexandr E. Sochnev, ulitsa Naberezhnaya 147, kv. 2, all of Donetsk; Jury P. Shamil, ulitsa 40 let Sovetskoi Ukrainy 13, kv. 2, Zaporozhie; Abram I. Khitrik, ulitsa pravdy 45a, kv. 10, Zaporozhie; Grigory I. Antipenko, ulitsa Lenina 153, kv. 8, Zaporozhie; Jury G. Smetanin, ulitsa Divnogorskaya 27, Zaporozhie; Albert N. Samsonov, prospekt Lenina 144, kv. 194, Zaporozhie; Vadim M. Ljudkovsky, ulitsa pobedy 99, kv. 51, Zaporozhie; Leonid M. Pokrass, ulitsa Pionerskaya 98, Donetsk; Anatoly A. Kurdjukov, bulvar Pushkina 25, kv. 13, Donetsk; Abram M. Ofengenden, ulitsa Tkachenko 135, kv. 20, Donetsk, and Georgy G. Zhitnik, bulvar Pushkina 25, kv. 21, Donetsk, all of U.S.S.R.

Continuation of Ser. No. 775,929, Mar. 9, 1976, abandoned. This application Apr. 27, 1978, Ser. No. 901,009

Int. Cl. C22B *9/10*

U.S. Cl. 75—257 **4 Claims**

1. An exothermic slag-forming mixture for refining metals, said mixture comprising an aluminium powder, sodium or potassium nitrate, a silica-containing component, calcium oxide, a compoent selected from the group consisting of expanded pearlite and fluorspar, and a silicon-containing component, said silicon being in elemental form.

4,177,071

RAPIDLY PROCESSABLE RADIOGRAPHIC MATERIALS

Luc A. De Brabandere, Lier; Hendrik A. Borginon, Mortsel; Herman A. Pattyn, Kapellen, and Robert J. Pollet, Vremde, all of Belgium, assignors to Agfa-Gevaert, N.V., Mortsel, Belgium

Filed Sep. 12, 1977, Ser. No. 832,662

Claims priority, application United Kingdom, Oct. 7, 1976, 41752/76

Int. Cl.[2] **G03C** *5/04, 5/24, 1/06, 1/28*

U.S. Cl. 430—494 **14 Claims**

1. A radiographic material for direct-exposure to penetrating radiation without fluorescent screens, comprising a transparent support and on one or both sides thereof a layer of a hydrophilic colloid silver halide emulsion whereby the total amount of silver halide per sq.m. corresponds to from about 13 g to about 40 g of silver nitrate, wherein:

(1) the halide of the silver halide emulsion substantially consists of bromide but may comprise at most 10 mole % of chloride and at most 3 mole % of iodide,

(2) the ratio of hydrophilic colloid to silver halide, expressed as silver nitrate, is at most about 1.0,

(3) the silver halide grains have an average grain diameter of at least 250 nm and are for at least 80% by weight regular in shape, and

(4) the emulsion is such that it has a surface sensitivity, measured at density 0.50 above fog according to normal photographic techniques by coating a test portion of the non-chemically sensitized emulsion on a conventional

support at a coverage of silver halide corresponding to 10 g of silver nitrate per sq.m. at a pH of 6.00 and a pAg of 8.00, exposing for 10^{-4} sec in a Mark VI Sensitometer of EG & G, Inc., Boston, Mass. USA using a General Electric type FT 118 electronic flash tube with a radiant energy of 100 Wattsec and developing for 10 min at 20° C. in the surface developer described hereinafter, at least equal to its internal sensitivity measured at density 0.50 above fog by coating and exposing an identical test portion in the same way as the first test portion, then bleaching the portion for 5 min at 20° C. in an aqueous bleaching solution containing 30 g of potassium hexacyanoferrate (III) and 30 mg of phenosafranine pro liter, and developing it for 15 min at 20° C. in the internal developer set forth hereinafter—

Surface developer

p-monomethylaminophenol sulphate: 2.50 g
ascorbic acid: 10.0 g
potassium bromide: 1.0 g
sodium metaborate-4-water: 35.0 g
water to make: 1.0 l

Internal developer

Same composition as surface developer to which 10 g of anhydrous sodium thiosulphate was added per liter.

4,177,072

PROCESS FOR PREPARING A LITHOGRAPHIC PRINTING PLATE WITH A THIOUREA WETTING SOLUTION

Yoshihiro Ono; Shigeo Harada; Yuzo Mizobuchi, and Tomoaki Ikeda, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Jun. 2, 1978, Ser. No. 912,150
Claims priority, application Japan, Jun. 2, 1978, 53/65151
Int. Cl.[2] G03F *7/02*; G03C *5/24*
U.S. Cl. 430—302 **7 Claims**

1. A process for preparing a lithographic printing plate which comprises

imagewise exposing a lithographic printing plate material comprising a support having thereon a light-sensitive layer comprising, as essential components, (a) an inorganic material selected from the group consisting of a chalcogenide, a chalcogenide composition, and a halide, and (b) at least one member selected from the group consisting of a metal, a metal oxide, a metal halide when (a) is a sulfur group element or a chalcogenide composition, and a metal sulfide which is not the same as the inorganic material (a), with both of the inorganic material (a) and the metal or metal compound (b) being in a state of contact with each other, and which, upon irradiation with said electromagnetic radiation, react with each other to form a mutually diffused state and, as a result, a difference in the hydrophilic property or in the oleophilic property occurs between the areas irradiated with said electromagnetic radiation and the non-irradiated areas, to electromagnetic radiation, and

then wetting the light-sensitive layer with a wetting solution containing (i) at least one compound selected from the group consisting of thiourea and a thiourea derivative and (ii) as an acid component, at least one compound selected from the group consisting of an inorganic acid, an acidic inorganic salt and an organic acid.

4,177,073

PHOTOSENSITIVE RESIN COMPOSITION COMPRISING CELLULOSE ETHER AROMATIC CARBOXYLIC ESTER

Yukinori Hata; Tsutomu Watanabe, and Fumio Itoh, all of Tokyo, Japan, assignors to Oji Paper Co., Ltd., Japan

Filed Nov. 17, 1977, Ser. No. 852,540
Claims priority, application Japan, Jun. 23, 1977, 52-73885
Int. Cl.[2] G03C *1/52, 1/68*; C08L *1/00, 3/00*
U.S. Cl. 430—188 **9 Claims**

1. A photosensitive composition comprising:

(A) a photosensitive resinous material selected from the group consisting of

(1) mixtures of at least one aromatic azido compound and at least one resin selected from the group consisting of novolak resins and hydroxypolystyrene resins and

(2) mixtures and reaction products of at least one resin selected from the group consisting of novolak resins and polycarbonate resins with an ortho-quinone diazido compound selected from the group consisting of benzoquinone- (1,2)-diazido and naphthoquinone-(1,2)-diazido, and;

(B) at least one cellulose ether aromatic carboxylic ester which is a reaction product of an aromatic polybasic carboxylic anhydride with a cellulose ether compound selected from the group consisting of those of the formulae (I) and (II);

$$R_a^1 R_b^2 A \quad (I)$$

and

$$R_c^3 R_d^4 R_e^5 A \quad (II)$$

wherein R^1 represents a hydroxyalkyl radical having 3 or 4 carbon atoms; R^2 and R^5 are a hydrogen atom or an alkyl radical having 1 or 2 carbon atoms, respectively; R^3 and R^4 represent a hydroxyalkyl radical having 2 to 4 carbon atoms, respectively, and are different from each other; A represents a cellulose residue, and; a, b, c, d and e, respectively, represent a positive number.

4,177,074

BUTADIENE/ACRYLONITRILE PHOTOSENSITIVE, ELASTOMERIC POLYMER COMPOSITIONS FOR FLEXOGRAPHIC PRINTING PLATES

Stephen Proskow, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 25, 1978, Ser. No. 872,082
Int. Cl.[2] G03G *1/68*
U.S. Cl. 430—286 **18 Claims**

1. A photosensitive, elastomeric composition which comprises, based on the total composition,

(a) 55 to 85% by weight of a high molecular weight butadiene/acrylonitrile copolymer having a number average molecular weight of 20,000 to 75,000, an acrylonitrile content of 10 to 50% by weight, and a carboxyl content of 1 to 15% by weight;

(b) 5 to 40% by weight of a low molecular weight butadiene polymer having a number average molecular weight of 750 to 10,000, an acrylonitrile content of 0 to 50% by weight, and a carboxyl content of 0 to 15% by weight, with the proviso that the combination of the high molecular weight butadiene/acrylonitrile copolymer and the low molecular weight butadiene polymer contains at least 2% by weight of carboxyl groups;

(c) 2 to 40% by weight of a nongaseous, ethylenically unsaturated compound containing at least one terminal ethylenic group, said compound being capable of forming a high polymer by free-radical initiated, chain-propagating addition polymerization and being compatible with polymers (a) and (b); and

(d) 0.001 to 10% by weight of an organic, radiation-sensitive,

free-radical generating system, activatable by actinic radiation which initiates polymerization of the unsaturated compound.

2. The photosensitive, elastomeric composition of claim 1 in which high molecular weight copolymer (a) and low molecular weight polymer (b) both have a carboxyl content of 2 to 10%.

4,177,075

JET PRINTING INK CONTAINING AMMONIUM FORMATE ELECTROLYTE

Ishwar R. Mansukhani, Neenah, Wis., assignor to M&T Chemicals Inc., Stamford, Conn.

Filed Jun. 5, 1978, Ser. No. 912,227
Int. Cl.[2] C09D *11/08*
U.S. Cl. 106—30 2 Claims

1. In an ink composition suitable for ink jet printing on metal surfaces, the ink incorporating, in solution, a colorant, a resin component, an alcohol-water solvent and an electrolyte, proportioned to give the ink properties of low surface tension, low viscosity and a low resistivity, the improvement comprising the presence of ammonium formate as an electrolyte thereby preventing color degradation or mutation.

4,177,076

WATER OR ALCOHOL SOLUBLE PRINTING INK COMPOSITION

Hisatake Sato, Yokohama, Japan, assignor to Nippon Oil Company, Ltd., Tokyo, Japan

Filed Apr. 10, 1978, Ser. No. 895,124
Claims priority, application Japan, Apr. 15, 1977, 52-43363; Apr. 15, 1977, 52-43364; Apr. 19, 1977, 52-44122
Int. Cl.[2] C09D *11/00;* C08F *212/08*
U.S. Cl. 106—32 6 Claims

1. A water soluble or alcohol soluble printing ink composition comprising:

(A) 10 to 50% by weight of a resin, said resin being prepared by radical-polymerizing a mixture consisting essentially of (a) an unsaturated aromatic hydrocarbon, (b) a monoacrylate or monomethacrylate of a polyhydric alcohol and (c) an α,β-unsaturated carboxylic acid in the presence of an organic solvent, said resin having an acid value of 5 to 150 and a hydroxyl value of 30 to 120;

(B) 30 to 80% by weight of a solvent selected from the group consisting of an alcohol having 1 to 10 carbon atoms, a mixed solvent of alcohol aqueous solution of an alkali and an aqueous solution of an alkali; and

(c) 1 to 40% by weight of a pigment or die.

4,177,077

GLASS COMPOSITION FOR FIBERIZATION

Lawrence V. Gagin, Littleton, Colo., assignor to Johns-Manville Corporation, Denver, Colo.

Continuation-in-part of Ser. No. 847,621, Oct. 31, 1977, abandoned. This application Sep. 19, 1978, Ser. No. 943,837
Int. Cl.[3] C03C *13/00, 3/08*
U.S. Cl. 106—50 9 Claims

1. A glass composition of improved moisture resistance in the form of fibers consisting essentially of by weight:

	Parts
SiO_2	54–57
Al_2O_3	3–4
CaO	10–13
Na_2O	16–19
B_2O_3	9–12
ZnO	1–3.5

and having a softening temperature of about 1207° F. to 1221° F., a Liquidus temperature of about 1700° F. to 1740° F., and a temperature at a viscosity of 1000 poises of 1690° F. to 1730° F.

4,177,078

THERMAL STABILIZATION OF SOIL

Walton W. Welna, and Lowell C. Frank, both of Saint Paul, Minn., assignors to Minnesota Mining & Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 793,933, May 5, 1977, abandoned. This application Apr. 6, 1978, Ser. No. 894,100
Int. Cl.[2] C04B *35/66*
U.S. Cl. 106—67 3 Claims

1. A process for providing a thermally stable environment for underground electrical equipment comprising the steps of:

(a) placing said equipment in an open trench;

(b) backfilling said trench with soil in which from about 1 to about 10 percent by weight of a stabilizing agent is thoroughly mixed in the presence of water, said stabilizing agent comprising a mixture of clay and a dispersing agent for said clay, wherein said dispersing agent comprises at least about 0.25% by weight of said stabilizing agent.

4,177,079

ASPHALTIC PAVING COMPOSITIONS AND METHOD OF PREPARATION FROM SOLID ORGANIC WASTES

Wilton F. Espenscheid, De Soto, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 20, 1978, Ser. No. 897,997
Int. Cl.[2] C08L *95/00*
U.S. Cl. 106—274 10 Claims

1. A process for liquefaction of solid organic waste material to provide asphaltic compositions suitable for use as paving binders which comprises forming a slurry of comminuted solid organic waste with sulfur and a petroleum solvent having a boiling point between about 450° F. and 1100° F. which has

(a) an H_{Ar} proton content between about 30 and 50 percent,

(b) a H_α proton content of at least 30 percent,

(c) a H_β proton content below 20 percent,

(d) a H_γ proton content below 13 percent, and

(e) a H_α/H_β proton ratio above about 1.4;

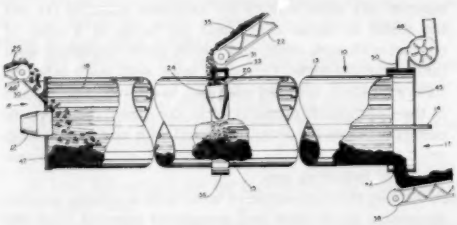
heating the slurry at a temperature in the range between about 300° F. and 1000° F. for a period of time sufficient to dissolve the slurry, and thereafter recovering a flowable heavy oil having a pitch-like consistency.

4,177,080

METHOD AND APPARATUS FOR RECYCLING ASPHALT-AGGREGATE COMPOSITIONS

Robert L. Mendenhall, 1770 Industrial Rd., Las Vegas, Nev. 89102

Continuation-in-part of Ser. No. 718,063, Aug. 26, 1976. This application Dec. 27, 1977, Ser. No. 864,673
Int. Cl.[2] B28C *1/22;* C08L *95/00*
U.S. Cl. 106—281 R 18 Claims



1. A process for producing asphalt-aggregate composition comprising

introducing non-asphalt containing aggregate particles in a

hot zone of a rotatable drum and gradually heating and advancing said aggregate toward an output drum end,

introducing solid particles of used asphaltic concrete comprising a mixture of asphalt and aggregate radially into said drum downstream from said hot zone in a cooler temperature zone,

gradually mixing and heating said aggregate with said asphaltic concrete particles, and

adding and mixing liquid asphalt with said particles downstream from said hot zone to produce said asphalt-aggregate composition.

4,177,081

TITANIUM DIOXIDE PIGMENT SLURRIES TO IMPART HIGH GLOSS TO WATER-BASED ACRYLIC PAINT SYSTEMS

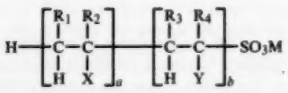
Raymond L. DeColibus, Camden, Tenn., assignor to E. I. DuPont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 857,676, Dec. 5, 1977, abandoned, which is a continuation-in-part of Ser. No. 753,460, Dec. 22, 1976, abandoned. This application Dec. 4, 1978, Ser. No. 966,253

Int. Cl.² C09C *1/36*

U.S. Cl. 106—300 **5 Claims**

1. An aqueous slurry of titanium dioxide pigment to provide a high-gloss finish to paint films derived from acrylic water-based systems, said slurry containing from 60 to 80 percent titanium dioxide, from 0.2 to 1 percent of a compound selected from the formula



where

M is alkali metal,

R_1 to R_4 is H, $-CH_3$ or C_2H_5,

X is —CN or $-COOR_5$ where R_5 is hydrogen or lower alkyl of 1–4 carbon atoms,

Y is —COOH or —COONa, and

a and b are 10 to 100,

from 0.1 to 0.6 percent of 2-amino-2-methyl-1-propanol and the remainder water.

4,177,082

PROCESS FOR GRANULATING PIGMENT COMPOSITIONS

George H. Robertson, Cincinnati, Ohio, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Mar. 20, 1978, Ser. No. 888,606

Claims priority, application United Kingdom, Mar. 18, 1977, 11633/77

Int. Cl.² C09C *3/08*

U.S. Cl. 106—309 **15 Claims**

1. A process for producing a pigment of dyestuff composition in the form of dustless readily-dispersible granules which comprises contacting, with agitation, (1) an aqueous dispersion of a pigment, (2) an aniline which is liquid at temperatures below 100° C., insoluble in water at pH values above 7, and soluble in water at pH values below 7, and (3) an organic carrier, which has a melting point above 40° C. and is soluble in, or at least softened by, the aniline and is insoluble or can be rendered insoluble in water throughout the pH range used in the process, the pH value being first above 7, maintaining the temperature above the melting point of the aniline and stirring at least until the pigment has migrated from the aqueous phase to the organic phase, consisting of the organic carrier and the aniline, and then reducing the pH to below 7 to render the aniline soluble in water, and recovering the resulting granules in a solvent free condition.

4,177,083

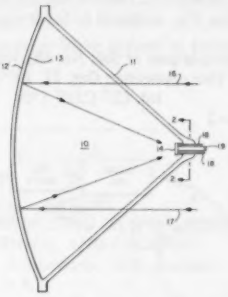
PHOTOVOLTAIC CONCENTRATOR

William S. Kennedy, San Jose, Calif., assignor to Acurex Corporation, Mountain View, Calif.

Filed Sep. 6, 1977, Ser. No. 830,780

Int. Cl.² H01L *31/04*

U.S. Cl. 136—89 CA **1 Claim**



1. A photovoltaic concentrator comprising photocell means for converting received light to electrical energy; reflector means for receiving sunlight and focusing such light onto said photocell; air tight enclosure means in a fixed physical relationship and containing an inert atmosphere, said enclosure means including first and second halves consisting of substantially identical transparent material each having matching extremities and joined together at such extremeties, said first half having an apex at which said photocell means is located within said enclosure and said second half being coated with reflective material to provide said reflector means.

4,177,084

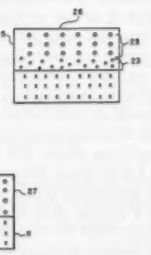
METHOD FOR PRODUCING A LOW DEFECT LAYER OF SILICON-ON-SAPPHIRE WAFER

Silvanus S. Lau; James W. Mayer, both of Pasadena, Calif., and Thomas W. Sigmon, Corvallis, Oreg., assignors to Hewlett-Packard Company, Palo Alto, Calif., by Thomas W. Sigmon, a part interest

Filed Jun. 9, 1978, Ser. No. 913,982

Int. Cl.² H01L *21/265, 7/00*

U.S. Cl. 148—1.5 **6 Claims**



1. A method for producing a silicon-on-sapphire wafer having a silicon layer on a sapphire substrate said method comprising the steps of:

epitaxially depositing a layer of monocrystalline silicon on the sapphire substrate;

performing an ion implantation into the silicon layer to form an amorphous region in the silicon layer near the surface of the sapphire substrate, but leaving substantially monocrystalline silicon in another region extending from the amorphous region to the surface of the silicon layer; and

annealing the wafer to convert the amorphous silicon to

monocrystalline silicon by regrowing the silicon from the remaining substantially monocrystalline silicon region toward the surface of the sapphire substrate.

4,177,085

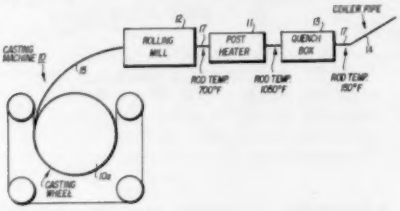
METHOD FOR SOLUTION HEAT TREATMENT OF 6201 ALUMINUM ALLOY

Kenneth E. Chadwick; E. Henry Chia, and Frank M. Powers, all of Carrollton, Ga., assignors to Southwire Company, Carrollton, Ga.

Continuation-in-part of Ser. No. 681,925, Apr. 30, 1976, abandoned. This application Oct. 12, 1977, Ser. No. 841,275

Int. Cl.[2] C22F *1/04*

U.S. Cl. 148—2 **16 Claims**



1. A method of continuously casting and rolling a heat treatable hot formed aluminum base alloy product comprising: casting a molten aluminum base alloy metal in a continuous casting mold; cooling said molten aluminum base alloy metal during casting to form a cast bar at a temperature above that temperature at which the alloying metals present in said aluminum base alloy metal would precipitate to the grain boundaries of said aluminum base alloy metal and at a rate at which solidification shrinkage will not occur; continuously removing said cast bar from said continuous casting mold and passing said cast bar to a hot rolling mill wherein said cast bar is hot formed into a wrought rod; initiating the step of hot forming the cast bar while the cast bar is at a temperature within the hot forming temperature range of the metal and which temperature is a solutionizing temperature of the metal, continuing the hot forming step while maintaining the temperature of the cast bar within the hot forming temperature range; immediately after the hot forming step and before any substantial cooling of the wrought rod, continuously passing the wrought rod to an in-line heater for approximately five seconds or less wherein the temperature of said wrought rod is raised to a temperature which is a solutionizing temperature of the metal and maintaining the temperature of the wrought rod for a time sufficient to solution heat treat said wrought rod and reducing the temperature of the wrought rod after the solution heat treating step at a rate so as to reduce the temperature of the wrought rod from the solutionizing temperature to a temperature at which no substantial immediate precipitation of alloying metal occurs.

2. A method of continuously casting an aluminum base alloy rod containing from about 0.5 to about 0.9 weight percent silicon, about 0.6 to about 0.9 weight percent magnesium and the remainder essentially aluminum comprising the steps of:

(a) pouring a molten aluminum base alloy containing from about 0.5 to about 0.9 weight percent silicon, about 0.6 to about 0.9 weight percent magnesium and the remainder essentially aluminum into the casting groove of a continuous casting wheel at a temperature above the melting point of the aluminum base alloy;

(b) cooling the molten aluminum base alloy in the casting groove to form a cast bar at a rate at which solidification shrinkage will not occur;

(c) removing the cast bar from the casting groove at a temperature below 940° F.;

(d) continuously hot forming the cast aluminum base metal at a temperature within the hot forming range to form a rod;

(e) immediately after the hot forming step and before any substantial cooling of the rod, continuously passing the rod through an in-line heater for approximately five seconds or less to raise the temperature of the rod to a temperature above the temperature at which the alloying metals will precipitate to the grain boundaries of the aluminum base metal; and

(f) continuously quenching the rod to a temperature below the temperature level at which immediate substantial precipitation of the alloying metals occur.

4,177,086

PROCESS FOR THE THERMAL TREATMENT AND THE QUENCHING OF FORGED ARTICLES

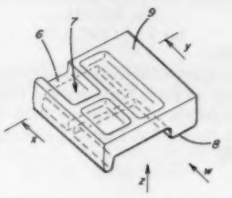
Jean-Marie A. Bouvaist, Grenoble, and Georges Lacoste, Issoire, both of France, assignors to Societe pour le Forgeage et l'Estampage des Alliages Legers FORGEAL, Paris, France

Filed Mar. 27, 1978, Ser. No. 890,680

Claims priority, application France, Mar. 31, 1977, 77 10496

Int. Cl.[2] C22F *1/04*

U.S. Cl. 148—12.7 A **6 Claims**



1. In the process for the treatment of a finished or semi-finished forged product having a relatively thick section made from billets or cast plates of age-hardening aluminum alloys useful in aeronautical applications, the improvement comprising:

thermally treating said product between the solidus temperature of equilibrium (T_1) and the liquidus temperature (T_2) for a period of 0.5 to 12 hours; coating the entire surface of said product with an insulating coating to increase the hardness of said product;

solution heat treating said coated product; and quenching said coated product in hot or boiling water.

4,177,087

MANUFACTURE OF SUPERCONDUCTING MEMBERS

James A. Lee; Peter E. Madsen, both of Harwell, and Ronald F. Hills, Newbury, all of England, assignors to United Kingdom Atomic Energy Authority, London, England

Continuation-in-part of Ser. No. 779,507, Mar. 21, 1977, abandoned. This application Aug. 7, 1978, Ser. No. 931,321

Claims priority, application United Kingdom, Mar. 23, 1976, 11708/76

Int. Cl.[2] H01L *39/24*

U.S. Cl. 148—11.5 R **5 Claims**

1. A method of manufacturing a superconducting member embodying a superconductor of A15 crystal structure having the general formula A_3B where A comprises niobium or vanadium and B comprises one or more of the elements of the group consisting of aluminium, gallium, indium, silicon, germanium, gold, platinum, antimony, rhodium, palladium, osmium, ruthenium, cobalt, thallium, lead, arsenic, bismuth, iridium and tin, which method comprises forming an alloy of copper with one or more of the elements B, including phosphorus in the alloy, contacting the alloy with a base material essentially consisting of the metal A, forming the contacted alloy into a unitary structure, the formation of the alloy being carried out such that, at least where it is in contact with the base material, the phosphorus concentration in the alloy is in the range 0.01 to 0.1 percent by weight, and heat treating the said unitary structure

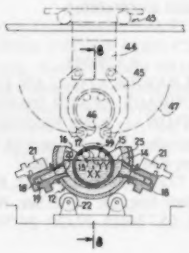
to cause reaction between the base material and the B element or elements to form superconducting A_3B compound.

4,177,088

PROCESS AND INSTALLATION FOR HEAT TREATING SPHEROIDAL OR LAMELLAR GRAPHITE CAST IRON PIPES

Michel Pierrel, Pont-a-Mousson, France, assignor to Pont-a-Mousson S.A., Nancy, France

Filed Mar. 1, 1978, Ser. No. 882,470
Claims priority, application France, Mar. 2, 1977, 77 06076
Int. Cl.[2] C21D *1/48*
U.S. Cl. 148—15 **16 Claims**



1. A process for effecting a heat treatment of a metal pipe, comprising engaging end portions of the pipe by rotary driving means in a region of the pipe above the axis of the pipe, driving the pipe in rotation about the axis of the pipe by said rotary driving means while suspending the pipe in a substantially horizontal position and partly immersing the pipe in a bath of molten metal at the desired temperature so that said region of the pipe and said rotary driving means are located above the level of the molten metal.

4,177,089

MAGNETIC PARTICLES AND COMPACTS THEREOF

Billye Bankson, Harvard, Ill., assignor to The Arnold Engineering Company, Marengo, Ill.

Continuation of Ser. No. 680,770, Apr. 27, 1976, abandoned. This application Apr. 24, 1978, Ser. No. 899,135
Int. Cl.[2] C04B *35/00*
U.S. Cl. 148—31.55 **13 Claims**

1. Magnetic powders for compaction into cores consisting essentially of a blend of

(1) 30 to 70% by weight iron particles, and

(2) 70 to 30% by weight particles of an iron alloy consisting essentially of 7 to 13% by weight silicon, 4 to 7% by weight aluminum and the balance being iron,

said particles containing a coating of an electrical insulator thereon to electrically insulate each of the particles from the other.

8. A core as defined in claim 6 wherein the insulator is an inorganic insulator.

4,177,090

MUFFLER MADE OF MANGANESE ALLOY

Silvestre Sanchez Torres, 30 Poniente No. 1512, Interior 2, Puebla, Pue, Mexico

Division of Ser. No. 891,258, Mar. 29, 1978, Pat. No. 4,147,527, which is a continuation-in-part of Ser. No. 699,599, Jun. 24, 1976, abandoned. This application Dec. 11, 1978, Ser. No. 967,941
Int. Cl.[2] C22C *22/00*
U.S. Cl. 148—32 **2 Claims**

1. A muffler having as a sheet metal component thereof a quenched rust-resistant alloy for high temperature use consisting essentially of:

1.0%–2.0% silicon
0.9%–1.9% copper
0.5%–0.12% carbon
0.5%–0.9% iron
0.2%–2.3% titanium
15.0%–22.0% chromium
2.5%–4.0% molybdenum
5.0%–10.0% aluminum
0.1%–0.3% selenium

and the balance manganese being present in amount less than about 70.0%.

4,177,091

METHOD OF PRODUCING SILICON-IRON SHEET MATERIAL, AND PRODUCT

Howard C. Fiedler, Schenectady, N.Y., assignor to General Electric Company, N.Y.

Filed Aug. 16, 1978, Ser. No. 934,194
Int. Cl.[2] H01F *1/04*
U.S. Cl. 148—111 **10 Claims**

1. The method of producing grain oriented silicon-iron sheet having superior magnetic properties and good weld characteristics which comprises the steps of providing a silicon-iron melt containing 2.2 to 4.5 percent silicon, between about three and 35 parts per million boron, between about 30 and 75 parts per million nitrogen in the ratio to boron of one to 15 parts per part of boron, from 0.02 to 0.05 percent manganese, less than 0.010 percent sulfur, tin in amounts ranging from 0.01 to 0.10 percent, and from 0.002 to 0.010 percent selenium, casting the melt and hot rolling the resulting billet to form an elongated sheet-like body, cold rolling the hot rolled body to provide a sheet of final gauge thickness, and subjecting the resulting cold-rolled sheet to a final heat treatment to decarburize it and to develope (110) [001] secondary recrystallization texture in it.

4,177,092

DIFFUSING AN ELEMENT INTO A METAL

Graham J. Thursby, Whitchurch, Wales, assignor to National Research Development Corporation, London, England

Filed Jan. 19, 1978, Ser. No. 870,645
Claims priority, application United Kingdom, Jan. 31, 1977, 03786/77
Int. Cl.[2] C21D *1/78*
U.S. Cl. 148—113 **26 Claims**

1. A method of diffusing an element into a transition series metal, for the purpose of improving a property, such as a magnetic property, of said metal, comprising:

selecting said element from the group consisting of silicon and aluminum,

forming an aqueous paste comprising the element in powdered form and sodium silicate in the ratio of 0.1 g to 6 g of said element per gram of sodium silicate.

applying to the metal said aqueous paste, and

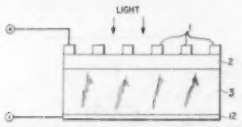
firing the pasted metal at a temperature from 680° C. to 1100° C. for a time period of from 15 minutes to 6 hours to produce a diffusion concentration gradient of said element into said metal smoothly varying from at least 5% at the surface of said metal to a maximum of 4% at the center of said metal.

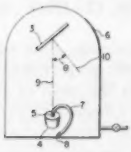
15. The method of claim 1, further comprising annealing the metal after firing.

4,177,093
METHOD OF FABRICATING CONDUCTING OXIDE-SILICON SOLAR CELLS UTILIZING ELECTRON BEAM SUBLIMATION AND DEPOSITION OF THE OXIDE

Tom Feng, Morris Plains, and Amal K. Ghosh, New Providence, both of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Continuation-in-part of Ser. No. 919,569, Jun. 27, 1978, abandoned. This application Nov. 22, 1978, Ser. No. 963,023
Int. Cl.[2] H01L *21/203, 27/14, 21/26*
U.S. Cl. 148—174 10 Claims



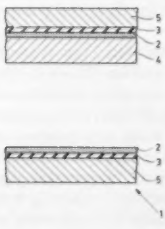


1. In the process of preparing a heterojunction device having an N-type oxide selected from tin oxide and indium tin oxide coating on N-type silicon substrate by directing an electron beam generated vapor stream of said oxide to impinge on said silicon substrate whereby the oxide is deposited thereon, the improvement comprising directing said vapor stream to impinge on said substrate such that the angle of incidence is sufficient to provide a maximum in the engineering efficiency of the cell wherein said angle of incidence is between 40 and 70.

4,177,094
METHOD OF TREATING A MONOCRYSTALLINE BODY UTILIZING A MEASURING MEMBER CONSISTING OF A MONOCRYSTALLINE LAYER AND AN ADJOINING SUBSTRATUM OF DIFFERENT INDEX OF REFRACTION

Simon G. Kroon, Stadskanaal, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 13, 1978, Ser. No. 941,969
Claims priority, application Netherlands, Sep. 16, 1977, 7710164
Int. Cl.[2] H01L *21/66, 21/20*
U.S. Cl. 148—175 7 Claims

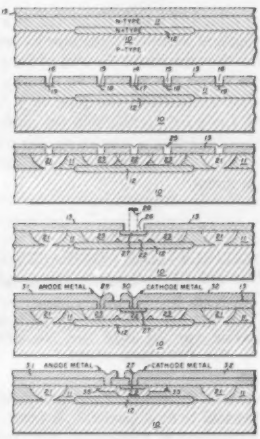


1. A method of manufacturing a semiconductor device which comprises the steps of:
providing a monocrystalline semiconductor body;
subjecting said body to a treatment in a gas atmosphere which changes the thickness of said body;
controlling the thickness of said body by means of a measuring member which is subjected to the same treatment, said member comprising a monocrystalline layer and an adjoining substratum of a material having a refractive index differing from that of the monocrystalline layer, the process of obtaining said measuring member comprising the steps of:
providing a substrate;
depositing said monocrystalline layer on said substrate;
forming the substratum on said monocrystalline layer; and
forming the measuring member by removing said substrate so as to leave a composite structure of said monocrystalline layer and said substratum.

4,177,095
PROCESS FOR FABRICATING AN INTEGRATED CIRCUIT SUBSURFACE ZENER DIODE UTILIZING CONVENTIONAL PROCESSING STEPS

Carl T. Nelson, Sunnyvale, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Division of Ser. No. 772,375, Feb. 25, 1977, Pat. No. 4,127,859. This application Aug. 14, 1978, Ser. No. 933,946
Int. Cl.[2] H01L *21/20, 29/90*
U.S. Cl. 148—175 10 Claims



1. The process of making a zener diode for incorporation into an integrated circuit using only the process steps associated with making the conventional integrated circuit, said process comprising the steps of:
depositing an epitaxial layer of one conductivity type on a wafer of the opposite conductivity type;
diffusing an impurity of said opposite conductivity type into a first limited surface region of said epitaxial layer;
continuing said first limited surface area diffusion to extend said diffusion completely through said epitaxial layer after the fashion of conventional integrated isolation diffusion thereby to create a first diode element;
diffusing an impurity of said one conductivity type, after the fashion of a transistor emitter diffusion, into said first diode element concentric therewith and smaller in diameter thereby to create a second diode element in P-N junction relation with said first diode element, said P-N junction having a zener breakdown voltage related to the concentration of said isolation diffusion;
forming ohmic connections to said first and second diode elements by the additional steps of:
diffusing an impurity of said opposite conductivity type into

a second limited surface region of said epitaxial layer simultaneously with the diffusion of said first limited surface region and spaced therefrom; continuing said second limited surface region diffusion simultaneously with continuing said first limited surface region diffusion to extend said diffusion completely through said epitaxial layer to form a diffused contact;

adjusting said spacing between said first and second limited surface regions so that after all diffusions are completed the edges of said first and second limited surface regions merge and the edges of said second limited surface region and said second diode element do not merge; and

establishing ohmic metal connections to said diffused contact and said second diode element.

4,177,096

METHOD FOR MANUFACTURING A SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE

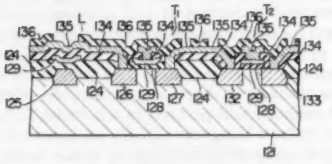
Tomisaburo Okumura, Kyoto; Hiroshi Okazaki, Takatsuki, and Akira Tsuchitani, Johyo, all of Japan, assignors to Matsushita Electronics Corporation, Osaka, Japan

Filed Jan. 25, 1977, Ser. No. 762,301

Claims priority, application Japan, Jan. 30, 1976, 51/9870

Int. Cl.[2] H01L *21/22*

U.S. Cl. 148—187 **4 Claims**



1. A method of manufacturing a semiconductor integrated circuit device having insulated gate field effect transistors which employs both a self-alignment diffusion process for forming self-aligned transistors and interconnections and a non-self-alignment diffusion process for forming non-self-aligned transistors and interconnections, characterized in that said method comprises the steps of

(a) forming an oxidation prevention layer of a material which prevents thermal oxidation of a semiconductor on the entire surface of a semiconductor substrate having a first type of conductivity;

(b) selectively removing said oxidation prevention layer by a photo-etching process using a mask having a perforated pattern for establishing areas on said substrate where said oxidation prevention layer is not removed and self-alignment diffusion and non-self-alignment diffusion will subsequently occur to respectively form said self-aligned and non-self-aligned transistors;

(c) carrying out a high temperature heating treatment to thermally oxidize those areas of said semiconductor substrate which are exposed and not covered by said oxidation prevention layer;

(d) removing said oxidation prevention layer from those areas on said substrate where non-self-alignment diffusion is to occur except areas which will correspond to the gates of non-self-aligned transistors, and thereafter carrying out a diffusion process to form first source and drain regions of the non-self-aligned transistors as well as first non-self-alignment interconnection regions, said first source, drain and interconnection regions having a second type of conductivity with respect to said substrate;

(e) removing all said oxidation prevention layers remaining over said substrate at those areas designated for self-alignment diffusion and all oxidation prevention layers remaining over said substrate at those areas designated for non-self-alignment diffusion to thereby expose said substrate, and, thereafter, forming a gate oxide film on said substrate over those exposed areas where the oxidation prevention layers have been removed;

(f) forming a gate electrode layer over the entire surface area of said substrate, and thereafter selectively removing said gate electrode layer to establish desired gate electrode regions where said gate electrode layer is not removed;

(g) selectively removing said gate oxide film using said gate electrode layers at the areas over said substrate designated for said self-alignment diffusion as a mask, and thereafter carrying out a diffusion process to form second source and drain regions of said self-aligned transistors as well as second self-aligned interconnection regions, said second source, drain and interconnection regions having said second type of conductivity; and

(h) forming electrodes connected to specified regions of the resulting integrated circuit device.

4,177,097

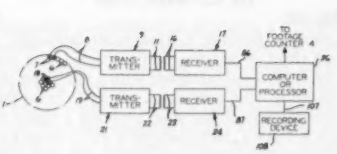
METHOD AND APPARATUS FOR CONTROLLING THE FILLING OF A CABLE

James A. Hudson, Jr., Atlanta; Raymond A. Levandoski, Doraville, and Allen K. Long, Roswell, all of Ga., assignors to Western Electric Co. Inc., New York, N.Y.

Division of Ser. No. 737,752, Nov. 2, 1976, Pat. No. 4,117,398, which is a continuation-in-part of Ser. No. 642,852, Dec. 22, 1975, abandoned. This application Jul. 7, 1978, Ser. No. 922,474

Int. Cl.[2] G01R *27/26;* **H01B** *13/00*

U.S. Cl. 156—48 **6 Claims**



1. A method of controlling the filling effectiveness of the filling operation in the manufacture of waterproof cables having a plurality of conductors therein, which comprises the steps of:

continuously monitoring the change in capacitance of an outer pair of conductors as the cable passes through a filling chamber;

continuously monitoring the change in capacitance of an inner pair of conductors as the cable passes through the filling chamber;

comparing the monitored changes in capacitance of the outside pair and the inside pair with each other to ascertain the filling effectiveness of the filling operation; and

generating control signals in response to deviations in filling effectiveness to vary a parameter of the filling operation to maintain such deviations within acceptable limits.

4,177,098

METHOD FOR STIFFENING FLEXIBLE WORKPIECES

Robert F. Gorini; Herbert Johnson, and Frederick S. Sillars, all of Beverly, Mass., assignors to USM Corporation, Farmington, Conn.

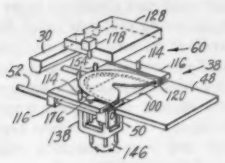
Division of Ser. No. 656,931, Feb. 10, 1976, Pat. No. 4,063,527. This application Jul. 8, 1977, Ser. No. 814,035

Int. Cl.[2] B29C *27/14;* **B29B** *3/00*

U.S. Cl. 156—80 **3 Claims**

1. The method of stiffening predetermined portions of flexible workpieces comprising depositing molten thermoplastic adhesive on a chilled surface so that the deposited adhesive is of substantially uniform thickness over a major portion of said surface and the upper surface of said adhesive includes a ridge of greater thickness adjacent to the marginal edge of the uniform thickness, the temperature of the chilled surface being selected to rapidly cool an under layer of the deposited adhe-

sive while permitting the portion of the ridge away from said surface to remain molten, bringing the chilled surface into adhesive transfer relation to the predetermined workpiece portion to be stiffened, next pressing the chilled surface and the



workpiece portion together to cause said portion of the ridge of still molten adhesive of greater thickness to be laterally exuded for hardening on the work with a reduced thickness, and thereafter relatively separating said surface from the workpiece to release the latter with the adhesive thereon.

4,177,099

METHOD OF BONDING POLYURETHANE SHEETING TO ACRYLIC OR POLYURETHANE SHEETING IN PRODUCTION OF TRANSPARENT WINDOWS

John Radzwill, Arnold, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sep. 2, 1975, Ser. No. 609,331
Int. Cl.[2] B32B *17/00*
U.S. Cl. 156—99 **6 Claims**

1. A method of forming a transparent laminated window comprising a sheet of acrylic plastic bonded to a preformed sheet of polymerized polyurethane with a minimum of opacity problems resulting from applying a primer to bond said sheets together, said method comprising applying a liquid composition containing 1 to 4 parts by weight of particles of a polymerized polyester urethane dissolved in 100 parts of chloroform as a primer to a surface of said sheet of acrylic plastic destined to be an interfacial surface between said sheet of acrylic plastic and said sheet of polyurethane in a transparent laminated window comprising said sheets, in an amount sufficient to form a film of dissolved polymerized polyester urethane on said applied surface, volatilizing said chloroform from said applied surface, assembling said sheets with said applied acrylic surface in face to face relation to a surface of said polyurethane sheet, and subjecting said assembly so formed to a temperature of approximately 160° F. to 300° F. (approximately 70° C. to 149° C.) for 30 minutes to 300 minutes at an elevated pressure for sufficient time to laminate said sheets and form a transparent laminate free of opacity problems.

4,177,100

PLASTIC SHEET SEALING PROCESS AND APPARATUS

William Pennington, 317 S. West St., Anaheim, Calif. 92805

Continuation of Ser. No. 749,828, Dec. 13, 1976, abandoned.
This application Apr. 27, 1978, Ser. No. 900,529
Int. Cl.[2] B29C *27/02;* **B65H** *69/06*
U.S. Cl. 156—157 **5 Claims**

1. In the method of forming an improved weld between plastic sheets, the steps that include:

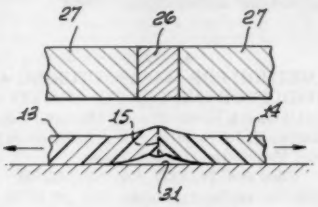
(a) initially forming a butt weld between the sheets by sealing the sheets together at overlaying edges thereof and thereafter deforming the butt weld and portions of the two sheets closest to the butt weld into a volumetric position substantially defined by two undeformed sample sheets positioned in edge-to-edge position, the work sheets and sample sheets having the same thickness, said deforming step including unfolding the sheets and stretching the sheets to stretch the butt weld, and

(b) heating the deformed work sheets under pressurization at and adjacent said butt weld to soften them during said sheet stretching and also relieving said stretching at the time of softening, thereby to form an improved weld therebetween characterized in that the sheet thickness is substantially constant at and proximate the weld.

4. In apparatus for forming an improved weld between plastic sheets that have been sealed along overlaying edges thereof to form a butt weld, the combination comprising:

(a) means for stretching the sheets and the butt weld therebetween into a volumetric position substantially defined by two undeformed sample sheets positioned in edge-to-edge position, the work sheets and sample sheets having the same thickness, and

(b) means for compressing and heating the stretched work



sheets at and proximate said butt weld to locally soften them during said stretching to form an improved weld therebetween characterized in that the sheet thickness is substantially constant at and proximate the weld, said means for stretching the sheets and butt weld being operable to relieve said stretching at the time of softening, and

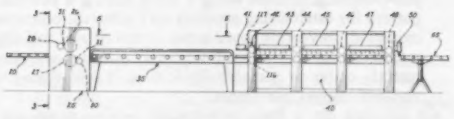
(c) auxiliary means including cool surfaces to engage portions of the work sheets on opposite sides of the butt weld and maintain said portions in non-melted condition, said cool surfaces being substantially coplanar with the surface of said compressing and heating means facing said sheets to thereby establish the resultant thickness of the sheets at and proximate the weld.

4,177,101

METHOD AND APPARATUS FOR LAMINATING PANELS

Ralph M. Evans, Phoenix, Ariz., assignor to Evans Rotork, Inc., Glendale, Ariz.

Filed Jan. 19, 1978, Ser. No. 870,608
Int. Cl.[2] B32B *31/00;* **C09J** *7/00*
U.S. Cl. 156—300 **42 Claims**



16. A method for adhering first and second laminates to lower and upper surfaces, respectively, of an at least semi-rigid substrate, said method comprising the steps of:

(a) applying a pattern of adhesive to the upper and lower opposed surfaces of the substrate;

(b) locating and positionally maintaining the first laminate in a fixed location to contactingly receive the lower surface of the substrate;

(c) transporting the substrate into an indexed relationship with the first laminate at the fixed location;

(d) indexing the substrate upon the first laminate and maintaining the substrate in indexed relationship thereto, including the steps of inserting the lateral and longitudinal edges of the substrate interior to the commensurate edges of the first laminate;

(e) locating and positionally maintaining the second laminate at the fixed location to contactingly engage the upper

surface of the substrate in indexed relationship thereto; and

(f) overlapping the lateral and longitudinal edges of the second laminate with respect to the corresponding edges of the substrate; whereby, the lateral and longitudinal edges of the composite unit overlaps the corresponding edges of the substrate.

4,177,102

SINGLE FACER FOR MANUFACTURING SINGLE-FACED CORRUGATED BOARD

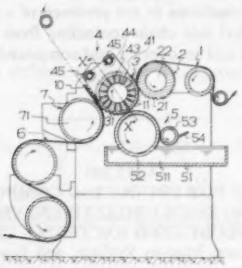
Masateru Tokuno, Nishinomiya, Japan, assignor to Rengo Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 778,613, Mar. 17, 1977, abandoned. This application Jul. 21, 1978, Ser. No. 926,853

Claims priority, application Japan, Apr. 19, 1976, 51-45136; Dec. 30, 1976, 51-158989

Int. Cl.² B31F *1/00*

U.S. Cl. 156—472 **12 Claims**



1. A single facer for manufacturing single-faced corrugated board comprising:

(a) a first corrugating roll;

(b) a hollow second corrugating roll meshing with said first corrugating roll to form a nip for receiving a sheet medium to corrugate the same;

(c) a source of suction connected to the hollow portion of the second corrugating roll to maintain pressure within the hollow portion below atmospheric pressure;

(d) plural axially spaced circumferential grooves disposed about the periphery of the second corrugating roll;

(e) plural suction conduits connecting the hollow portion of the second corrugating roll to at least some of the circumferential grooves, whereby suction attracts and holds the corrugated medium onto a portion of the peripheral surface of the second corrugating roll;

(f) sealing means having members engaging within the grooves to seal at least some of the conduits disposed in that portion of the second corrugating roll not lapped by the corrugated medium;

(g) means for applying adhesive to the peaks of the flutes of the corrugated medium; and

(h) a pressure roll for pressing a sheet linerboard against the corrugated medium after the adhesive has been applied, to bond the linerboard to the corrugated medium.

4,177,103

APPARATUS FOR THE PREPARATION OF A MULTILAYER FILM

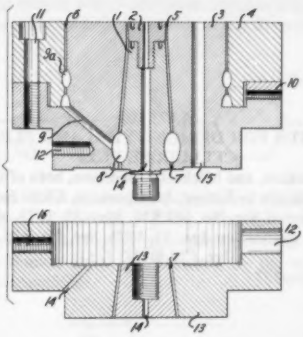
Josef Kubát, Solna, and Kenneth S. Berggren, Mölndal, both of Sweden, assignors to Celloplast AB Norrkoeping, Norrköping, Sweden

Division of Ser. No. 630,786, Nov. 11, 1975, Pat. No. 4,076,568, which is a continuation of Ser. No. 448,640, Mar. 4, 1974, abandoned. This application Sep. 6, 1977, Ser. No. 830,579

Claims priority, application Sweden, Mar. 16, 1973, 7303751

Int. Cl.² B30B *11/22*; B31B *31/30*; B29D *23/04*

U.S. Cl. 156—500 **3 Claims**



1. An apparatus comprising an extruder, a film blowing die and a drawing and winding means wherein the film blowing die comprises an inner cone, an intermediate part, an outer ring, at least two concentric slots situated in the same plane, the exterior concentric slot being formed between the intermediate part and the outer ring and having a diameter at least four times larger than the diameter of the interior concentric slot formed between the inner cone and the intermediate part, a feed slot for introducing a plastic melt material from the extruder into the blowing die, a portion of the feed slot being enlarged and designed to divide the plastic melt material between said interior slot and channels communicating with the exterior slot, said channels having enlarged portions in relation to the exterior slot, and a gas channel formed in the inner cone.

4,177,104

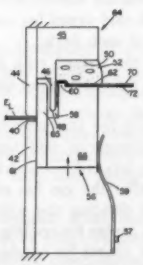
APPARATUS FOR SEPARATING LAMINATED LAYERS

Robert H. Parker, Thiensville, Wis., assignor to W. H. Brady Co., Milwaukee, Wis.

Filed Nov. 14, 1977, Ser. No. 851,307

Int. Cl.² B32B *35/00, 07/12*

U.S. Cl. 156—584 **2 Claims**



1. Apparatus for separating layers of a laminate at an end thereof, comprising

means for supporting said laminate to permit bending thereof at said end, and

means for bending both said layers sharply in one direction

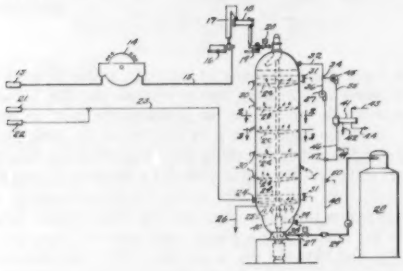
at one portion of said laminate close to said end, and bending both said layers sharply in the opposite direction at a lengthwise-adjacent portionof said laminate closer to said end, to cause shearing and lengthwise offset between said layer, and then releasing both said layers at said end to permit them to spring back from said bending.

4,177,105

APPARATUS FOR DELIGNIFYING AND BLEACHING CELLULOSE PULP

Oliver A. Laakso, and Michael I. Sherman, both of Glens Falls, N.Y., assignors to Kamyr, Incorporated, Glens Falls, N.Y.

Continuation of Ser. No. 362,924, May 22, 1973, abandoned.
This application Jun. 11, 1976, Ser. No. 695,559
Int. Cl.[2] D21C *7/12*
U.S. Cl. 162—237 **1 Claim**



1. An apparatus for treating cellulose pulp with oxygen gas in an exothermic reaction comprising

a vertically elongated pressure vessel provided with a plurality of vertically spaced pulp support decks,

means for supplying cellulose pulp into the uppermost of said decks,

means for passing the thus supplied pulp downwardly and sequentially from one deck to another,

means for supplying oxygen into the bottom of said vessel for passage upwardly through said vessel for contact with and treatment of the pulp at each deck, and means for supplying steam into the bottom of said vessel for passage upwardly through said vessel for contact with and treatment of the pulp at each deck,

means for washing the treated pulp at the bottom of said vessel and means for discharging the washed pulp therefrom, and

means for controlling the temperature of the pulp on the various decks throughout said vessel, said last-named means comprising means for withdrawing hot oxygen gas from the vessel after the gas has contacted pulp in said vessel, means for dividing the withdrawn gas into two separate portions, means for cooling one of these portions of withdrawn gas, means for combining the two portions after the one portion has been cooled, means for returning the combined portions to said vessel and means for distributing the thus returned gas into the vessel at a plurality of points therein adjacent different decks of said vessel so that the distribution of the cooled return gas is generally even and so that the formation of hot spots is prevented.

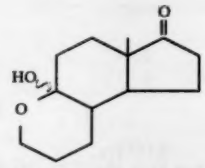
4,177,106

PROCESS FOR PREPARING 3Aα-H-4α-[3′-PROPANOL]-7Aβ-METHYLHEXAHYDRO-1,5-INDANEDIONE HEMIKETAL

Thomas R. Pyke, Portage, and Marion P. Salmond, Kalamazoo, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 768,025, Feb. 14, 1977, Pat. No. 4,097,335.
This application Feb. 21, 1978, Ser. No. 879,775
Int. Cl.[2] C12D *13/00*
U.S. Cl. 435—125 **8 Claims**

1. A process for preparing a compound, of the formula



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which comprises cultivating a mutant microorganism selected from the group consisting of Arthrobacter, Bacillus, Brevibacterium, Corynebacterium, Nocardia, Protaminobacter, Serratia, and Streptomyces, said mutant being characterized by its ability to selectively degrade steroids with or without a 17-alkyl side chain of from 2 to 10 carbon atoms, inclusive, and accumulate predominantly 3aα-H-4α-[3′-propanol]-7aβ-methylhexahydro-1,5-indanedione hemiketal in the fermentation beer, in an aqueous nutrient medium at a pH of 3.0 to 6.0 under aerobic conditions in the presence of a steroid with or without a 17-alkyl side chain containing from 2 to 10 carbon atoms, inclusive and recovering said compound from the cultivated medium.

4,177,107

PROCESS FOR PRODUCING COMPOSITION CONTAINING INSOLUBILIZED ENZYME AND/OR INSOLUBILIZED BACTERIAL CELLS

Minoru Kumakura; Masaru Yoshida, and Isao Kaetsu, all of Takasaki, Japan, assignors to Japan Atomic Energy Research Institute, Tokyo, Japan

Filed Jan. 28, 1977, Ser. No. 763,601
Claims priority, application Japan, Jan. 31, 1976, 51-9702
Int. Cl.[2] C07G *7/02*
U.S. Cl. 435—176 **4 Claims**

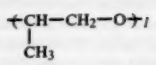
1. A process for producing a composition containing insolubilized enzyme and/or insolubilized bacterial cells which comprises (i) the step of mixing (a) an aqueous solution of enzyme and/or an aqueous dispersion of bacterial cells, (b) at least one porous adsorbent and (c) at least one vitrifiable monomer selected from the group consisting of a compound having the formula:

$$CH_2=CX-\underset{\underset{O}{\|}}{C}-O-R^1-R^2$$

wherein X is H or methyl, R^1 is $+CH_2+_n$ wherein n is an integer of 1 to 6,

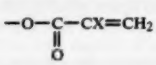
$$-\underset{\underset{CH_3}{|}}{\overset{CH_3}{\overset{|}{C}}}-,$$

$+CH_2-CH_2-O+_m$ wherein m is an integer of 2 or more, or

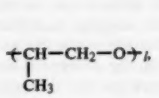


wherein l is an integer of 2 or more, and when R^1 is $+CH_2+_n$ or

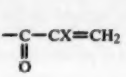
R^2 is —OH, —OCH_3 or



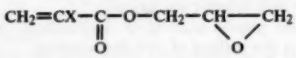
wherein X is as defined above, when R^1 is $+CH_2—CH_2+O_m$ or



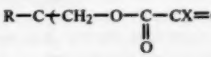
R^2 is hydrogen, methyl, or



wherein X is as defined above; or a compound having the formula:



wherein X is as defined above; a compound having the formula



wherein R is ethyl, n-propyl or isopropyl and X is as defined above; and mixtures thereof, and (ii) the step of irradiating the mixtures by means of an ionizing radiation at a temperature of less than − 10° C.

4,177,108

PROCESS FOR PRODUCING EMITANIN

Koji Sakakida, 26-11, 5-chome, Kamisaginomiya, Nakano-ku, Tokyo, Japan (165), and Tetsuro Ikekawa, 12-5, 1-chome, Sodegaura, Narashino-shi, Chiba-ken, Japan (275)

Filed Feb. 27, 1978, Ser. No. 881,744

Claims priority, application Japan, Mar. 2, 1977, 52-021456; Jun. 17, 1977, 52-071130

Int. Cl.² C12D *13/00*

U.S. Cl. 435—74 **19 Claims**

1. A process for producing EMITANIN which comprises inoculating mycelia of *Tricholoma matsutake, Tricholoma bakamatsutake, Volvariella volvaea* or *Tremella fuciformis* in a medium for growing mycelia and fermenting the grown mycelia in a liquid medium containing a carbohydrate and a nitrogen source and isolating solid substance of mycelia from a broth and extracting the solid substance of mycelia with a hot water and isolating the active ingredients.

4,177,109

γ-GLUTAMYL-P-AMINOANILIDE DERIVATIVES FOR MEASURING ACTIVITY OF γ-GLUTAMYL TRANSPEPTIDASE

Takanori Tohyama, and Masaaki Nakahata, both of Kawagoe, Japan, assignors to Wako Pure Chemical Industries, Ltd., Osaka, Japan

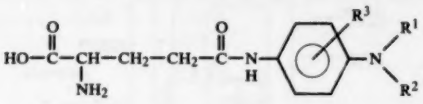
Filed May 30, 1978, Ser. No. 910,830

Claims priority, application Japan, May 30, 1977, 52/63061

Int. Cl.² G01N *33/14*

U.S. Cl. 435—24 **7 Claims**

1. A method for measuring γ-glutamyl transpeptidase activity in a living sample which comprises using as a substrate the γ-glutamyl-p-aminoanilide derivative of the formula:



wherein R^1 and R^2 are independently a lower alkyl group; and R^3 is hydrogen, a lower alkyl group, a carboxyl group, or a sulfo group, and determining colorimetrically the amount of p-phenylenediamine derivative liberated by the action of γ-glutamyl transpeptidase.

4,177,110

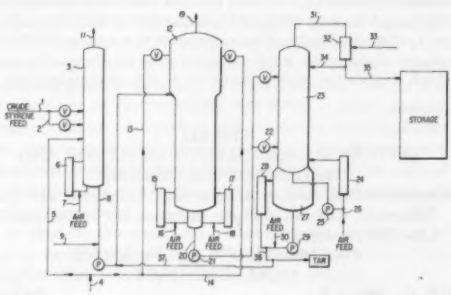
METHOD FOR THE DISTILLATION OF VINYL AROMATIC COMPOUNDS USING POLYMERIZATION INHIBITORS WITH LOW-VOLATILITY

James M. Watson, Big Spring, Tex., assignor to Cosden Technology, Inc., Big Spring, Tex.

Filed Jul. 18, 1978, Ser. No. 925,817

Int. Cl.² B01D *3/34*; C07C *7/18*

U.S. Cl. 203—9 **13 Claims**



1. A process for the distillation of a readily polymerizable vinyl aromatic compound employing as a polymerization inhibitor the combination of phenothiazine ($C_{19}H_9NS$) and tertiarybutylcatechol (TBC), comprising the steps of:

(a) introducing a feed of impure vinyl aromatic compound into a distillation train containing a recycle column and a finishing column, said feed being introduced into the recycle column;

(b) introducing as a separate stream into the upper portion of said recycle column an effective polymerization inhibiting amount of said inhibitor combination in a volatile aromatic hydrocarbon diluent; and,

(c) distilling said feed under distillation conditions in the presence of oxygen to recover from the finishing column of said distillation train an overhead product of high purity vinyl aromatic compound and a residual bottoms fraction.

4,177,111
PROCESS FOR THE RECOVERY OF DIMETHYLACYLAMIDES

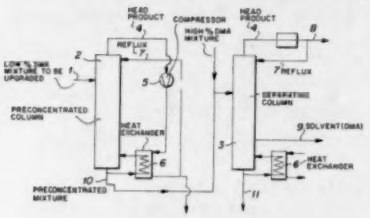
Christian Pieper, Neuss; Surinder S. Sandhu, Dormagen; Günter Schümmer, Cologne, and Karlheinz Feltgen, Dormagen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jun. 23, 1977, Ser. No. 809,494

Claims priority, application Fed. Rep. of Germany, Jul. 15, 1976, 2631734

Int. Cl.[2] B01D *3/00*; C07C *99/12, 103/36*

U.S. Cl. 203—14 4 Claims



1. A process for the recovery of dimethylacylamides from mixtures containing dimethylacylamides and water formed during the production of synthetic fibers comprising: segregating low proportion dimethylacylamide and water mixtures containing up to 50% dimethylacylamide from high proportion dimethylacylamide and water mixtures containing greater than 90% dimethylacylamide, pre-concentrating the segregated low porportion mixtures which contain dimethylacylamide in amounts of up to 50% in at least one first distillation column, in which a sump product is concentrated to dimethylacylamide contents of 30 to 90% at pressures above 300 Torr and in which an overhead vapor product is formed, compressing the overhead vapor product and utilizing the latent heat of condensation of the overhead vapor product, after compression, for heating the first distillation column, and removing the sump product from the first distillation column and further distilling said sump product in a second distillation column along with nonpreconcentrated mixtures the latter which contain the high proportion of dimethylacylamides.

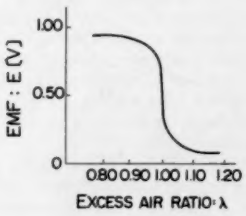
4,177,112
OXYGEN CONCENTRATION DETECTOR AND METHOD OF USE THEREOF

Masatosi Suzuki, Kariya; Kazuya Soda, Takahama, and Yasuo Nakamura, Anjo, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Mar. 27, 1978, Ser. No. 890,903

Int. Cl.[2] G01N *27/58*

U.S. Cl. 204—1 T 9 Claims



1. In an oxygen concentration detector having an oxygen concentration sensor made of an oxygen ion conductive metal oxide which produces an electromotive force in accordance with the difference between an oxygen concentration in gas components of a gas under test and the oxygen concentration in a reference gas, including a first electrode formed on the side of said oxygen concentration sensor which is to be exposed to the gas under test, and a second electrode formed on the side of said oxygen concentration sensor which is to be exposed to said reference gas so that the electromotive force produced by said oxygen concentration sensor is measured across said first and second electrodes;

the improvement comprising;

(i) a first porous coating of a refractory metal oxide coated on the surface of said first electrode, the grain size of said first porous coating being finer than about 250 mesh and said first porous coating having pores through which the gas under test can pass; and

(ii) a second porous coating of a refractory metal oxide coated on the surface of said first coating, the grain size of said second porous coating being about 250 to about 100 mesh and said second porous coating having pores whose average diameter is larger than that of the pores of said first coating.

8. A method of detecting the oxygen concentration in the exhaust gas comprising oxygen, phosphorus, lead and oil from an internal combustion engine comprising:

a. exposing to said exhaust gas an oxygen concentration detector having an oxygen concentration sensor of an ion conductive metal oxide producing an electromotive force in accordance with the difference between the gas coponents of said exhaust gas and the oxygen concentration of a reference gas containing oxygen, said sensor including:

(1) a first electrode formed on the portion of said sensor exposed to the exhaust gas;

(2) a second electrode formed on the portion of said sensor exposed to said reference gas such that in operation an electromotive force is produced across said first and second electrodes;

(3) a first porous coating of a refractory metal oxide coated on the surface of said first electrode,

the grain size of said first porous coating being smaller than about 250 mesh and having pores therein through which said exhaust gas passes;

(4) a second porous coating of a refractory metal oxide coated on the surface of said first coating,

the grain size of said second coating being about 250 to about 100 mesh and having pores therein whose average diameter is larger than that of the pores of said first coating;

b. exposing said second electrode to said reference gas; and

c. measuring the electromotive force produced between said first and second electrodes thereby determining the oxygen concentration in said exhaust gas.

4,177,113
METHOD OF ELECTROFORMING SHEETS AND SELF-STRIPPING CATHODE

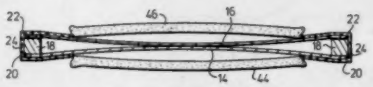
Willie Seibt, Edmonton, Canada, assignor to Sherritt Gordon Mines Limited, Toronto, Canada

Filed Jul. 27, 1978, Ser. No. 928,347

Claims priority, application Canada, Apr. 28, 1978, 302292

Int. Cl.[2] C25D *1/04, 1/20*

U.S. Cl. 204—12 6 Claims



1. A method of obtaining a metal from a solution thereof by electrodeposition on a cathode, including depositing said metal on a cathode having a hollow body with opposed, spaced sheet-like parallel walls with outer faces, said body having outer surfaces between said outer faces of said walls upon which substantially no metal is deposited during use of the

cathode so that metal is deposited as two separate sheets, one sheet on each wall, said walls being resiliently deformable, and connecting the hollow body to a source of reduced pressure, after metal has been deposited on said walls, to cause said walls to bow inwardly towards one another with resultant separation of the deposited metal sheets from the walls.

4,177,114

SILVER-ELECTROPLATING PROCESS

Yoshihiro Suzuki; Mitsuru Ura, both of Hitachi, and Hiroshi Takahashi, Higashi Ibaraki, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Aug. 29, 1978, Ser. No. 937,803
Claims priority, application Japan, Sep. 2, 1977, 52-104888
Int. Cl.[2] C25D *5/34*
U.S. Cl. 204—38 B **18 Claims**

1. A process for silver-plating which comprises the steps of preplating a substrate material in an aqueous preplating solution comprising 10^{-5} to 0.02 mole/l of silver and more than 0.01 mole/l of a silver complexing agent under non-current density, to preplate a sufficient thickness of silver to restrain or substantially prevent substitution plating, and then electroplating the preplated substrate material by supplying an electric current to said material in an aqueous silver plating solution comprising silver and thiocyanic ions and having a pH in a range of from 0.5 to 10.5.

4,177,115

ELECTROCHEMICAL PRODUCTION OF ORGANIC HYPOHALITE COMPOUNDS IN AN UNDIVIDED CELL

Ronald L. Dotson, Cleveland, and Richard W. Lynch, Chattanooga, both of Tenn., assignors to Olin Corporation, New Haven, Conn.

Filed Aug. 28, 1978, Ser. No. 937,223
Int. Cl.[2] C25B *3/02*
U.S. Cl. 204—78 **40 Claims**

1. A process for the preparation of organic hypohalites in an electrolytic cell having an electrolytic chamber containing therein an anode and a cathode separated by a gap distance, which comprises:

(a) charging an electrolyte comprised of a mixture of a halide-containing brine, and an organic alcohol in an organic solvent into said electrolytic chamber wherein said organic alcohol is selected from the group consisting of secondary alcohols, tertiary alcohols, cyclic alcohols, and mixtures thereof,

(b) passing an electric current between said anode and said cathode, whereby said organic alcohol reacts with said halide to form the corresponding organic hypohalite in said electrolyte, and

(c) recovering said organic hypohalite from said electrolytic chamber.

4,177,116

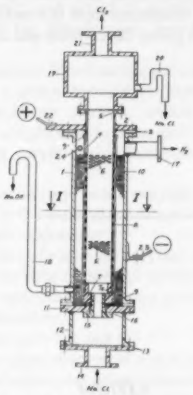
ELECTROLYTIC CELL WITH MEMBRANE AND METHOD OF OPERATION

Oronzio DeNora, Milan, and Alberto Pellegri, Luino, both of Italy, assignors to Oronzio DeNora Impianti Elettrochimici S.p.A., Milan, Italy

Continuation-in-part of Ser. No. 864,855, Dec. 27, 1977, abandoned. This application May 30, 1978, Ser. No. 910,494
Claims priority, application Italy, Jun. 30, 1977, 25251 A/77
Int. Cl.[2] C25B *1/46, 11/03, 15/00*
U.S. Cl. 204—98 **18 Claims**

1. An electrolysis cell comprising an anode compartment containing an electrolyte permeable anode and a cathode compartment containing a cathode separated by an ion exchange membrane supported on the electrolyte permeable anode, means to impress an electrolysis current on the cell, means for introducing anolyte to the anode compartment, means to introducing catholyte to the cathode compartment, means for removing spent anolyte and electrolysis products from the anode compartment and means for removing spent catholyte and electrolysis products from the cathode compartment, the cathode being a static bed of electrically conductive catholyte-resistant particulate material filling the cathode compartment whereby the membrane is pressed against the anode.

2. An electrolytic cell comprising a container of cathodically resistant metal, a valve metal top on said container electrically insulated from said container, at least one tubular valve metal anode connected to and extending from said top substantially to the bottom of said container, perforations through a portion of the walls of said anode inside said container and an imperforate portion of said anode extending from just below the top of said container to said valve metal top, said anode being open at both ends, an ion permeable membrane on the perforated walls of said anode, a porous, static bed of electrically conductive particulate cathodic material between said membrane and the



walls of said container, openings into the tubular anode through the bottom of said container, means to feed electrolyte into the bottom of said tubular anode, means to electrically insulate said anode at the top and bottom from said container, means to convey positive electric current to said anode, means to convey negative electric current from said container, means to conduct gaseous products produced on said anode and electrolyte out of said container, means to conduct gaseous cathodic products produced in said container out of said container, means to introduce liquid into the cathodic compartment of said container between said membrane and the walls of said container and means to convey liquid cathodic products out of said container.

7. Method for the production of halogen and a hydroxide of an alkali metal by electrolysis of an aqueous solution of the respective alkali metal halide in the cell of claim 2.

4,177,117

BIPOLAR REFINING OF LEAD

Robert C. Kerby, Rossland, Canada, assignor to Cominco Ltd., Vancouver, Canada

Filed May 30, 1978, Ser. No. 910,947
Claims priority, application Canada, Apr. 6, 1978, 300642
Int. Cl.[2] C25C *1/18*
U.S. Cl. 204—114 **38 Claims**

1. A process for the electrorefining of lead from lead bullion using an aqueous electrolyte containing lead fluosilicate and hydrofluosilicic acid contained in an electrolytic cell, which comprises interposing in the cell between an anode and a cathode one or more electrically unconnected lead bullion bipolar electrodes, allowing electrolysis to proceed to deposit refined lead and recovering said refined lead.

4,177,118

PROCESS FOR ELECTROLYZING WATER

Barrie C. Campbell, Payson, Utah, assignor to Billings Energy Corporation, Provo, Utah

Continuation-in-part of Ser. No. 661,788, Feb. 26, 1976, Pat. No. 4,056,452, and a continuation-in-part of Ser. No. 661,789, Feb. 26, 1976, Pat. No. 4,057,479. This application Oct. 25, 1977, Ser. No. 845,319

Int. Cl.[2] C25B *1/10*

U.S. Cl. 204—129 **6 Claims**

1. A method for electrolysis of a liquid consisting essentially of water to produce hydrogen and oxygen therefrom, said method comprising positioning a solid polymer electrolyte membrane between an anode comprising lead dioxide and a cathode, said anode and cathode contacting mutually opposite sides of said membrane; wetting with water the surfaces of the anode and cathode which abut said membrane; and passing a current through said membrane from the anode to the cathode to generate hydrogen gas at the cathode and oxygen gas at the anode.

4,177,119

PROCESS FOR RECOVERY OF WASTE H_2SO_4 AND HCl

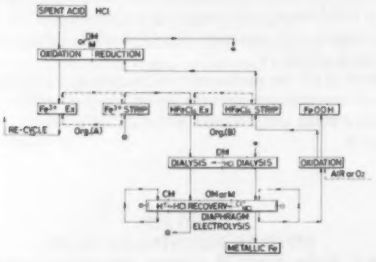
Morio Watanabe, Amagasaki, and Sanji Nishimura, Kyoto, both of Japan, assignors to Solex Research Corporation, Osaka, Japan

Continuation of Ser. No. 773,657, Mar. 2, 1977, Pat. No. 4,113,588. This application Aug. 24, 1978, Ser. No. 936,595

Claims priority, application Japan, Mar. 9, 1976, 51/25223; Mar. 25, 1976, 51/33029; Oct. 4, 1976, 51/118598

Int. Cl.[2] C25B *1/22*

U.S. Cl. 204—151 **12 Claims**



1. A process for the recovery of waste HCl from an aqueous metal pickling solution which contains large amounts of Fe ions comprising:
   1. converting the Fe^{2+} ions in the waste to Fe^{3+} ions;
   2. extracting the Fe^{3+} ions from the converted solution from step 1 with an organic solvent C to form an $FeCl_3$-complex therein and to produce an aqueous raffinate;
   3. regenerating solvent C by contacting it with an aqueous extractant to extract the Fe^{3+} therefrom;
   4. subjecting the raffinate from step 2 to diaphragm electrolysis to recover HCl therefrom.

4,177,120

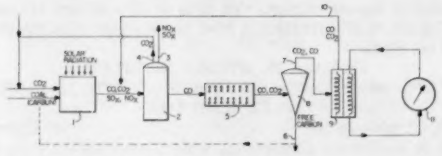
PHOTOLYTIC PROCESS FOR GASIFICATION OF CARBONACEOUS MATERIAL

Stephen Zenty, Rockville, Md., assignor to Solarco Corporation, Rockville, Md.

Continuation-in-part of Ser. No. 792,446, Apr. 29, 1977, abandoned. This application Apr. 14, 1978, Ser. No. 896,484

Int. Cl.[2] B01J *1/10*

U.S. Cl. 204—157.1 R **11 Claims**



1. A photolytic process for the gasification of coal comprising the step of directly solar irradiating coal and carbon dioxide in an air free environment, and at elevated temperatures to produce carbon monoxide.

4,177,121

METHOD OF PRODUCING N-FORMYLAMINE

Wataru Ando, Sakura, and Kazuo Watanabe, Kiryu, both of Japan, assignors to K. K. Pollution Preventing Research Laboratory, Tokyo, Japan

Filed Jul. 21, 1978, Ser. No. 926,717

Claims priority, application Japan, Jul. 22, 1977, 52/87304

Int. Cl.[2] B01J *1/10*

U.S. Cl. 204—158 R **7 Claims**

1. A direct method of producing an N-formylamine and a lower oxo by-product comprising conducting a photosensitized oxygenation of a reaction mixture, in the presence of a solvent therefor, said mixture comprising (a) an aldehyde having at least one α-hydrogen and at least two carbon atoms, (b) an aliphatic or heterocyclic secondary amine and (c) a sensitizer, whereby a carbonyl transfer to the secondary amine occurs which results in a reduction in the carbon atoms of the aldehyde.

4,177,122

PHOTOPOLYMERIZABLE HYDROXY-BENZOPHENONE DERIVATIVE COMPOUNDS AND PHOTOCURABLE COMPOSITIONS

Kozi Sato, Tokyo, Japan, assignor to Toyo Ink Manufacturing Co., Ltd., Tokyo, Japan

Filed Dec. 19, 1978, Ser. No. 970,902

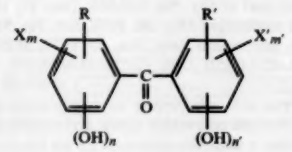
Claims priority, application Japan, Jan. 13, 1978, 53-2037

Int. Cl.[2] C08F *2/46, 8/00*

U.S. Cl. 204—159.16 **10 Claims**

1. A process for preparing a photopolymerizable photosensitizing compound comprising the steps of:

addition reacting with an alkylene oxide a benzophenone derivative represented by the following general formula (I)



(I)

wherein R and R' are an alkyl or alkoxy group having 1 to 20 carbon atoms, n is an integer of 1 to 3, n' is an integer of 0 to 3, X and X' are a halogen atom, and m and m' are an integer of 0 to 3, to obtain a hydroxyl group-containing reaction product and then

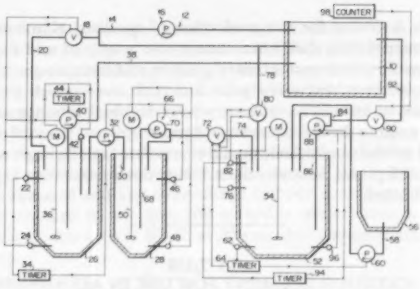
esterifying the thus obtained reaction product with an unsaturated carboxylic acid to obtain the photopolymerizable photosensitizing compound.

4,177,123

METHOD FOR SUPPLYING BINDER INTO A COATING BATH AND ITS APPARATUS

Nobuo Siozawa; Uhee Kikuchi; Suguru Kimura, all of Sayama; Nobuaki Todoroki, Warabi; Jun-ichi Yasukawa, Chigasaki, and Satoru Kamiyama, Tokyo, all of Japan, assignors to Taikisha Ltd.; Honda Motor Co., Ltd., both of Tokyo and Shinto Paint Co., Ltd., Amagasaki, all of, Japan

Filed Oct. 31, 1978, Ser. No. 956,345
Int. Cl.[2] C25D *13/22, 13/24*
U.S. Cl. 204—181 C 2 Claims



1. A method for supplying binder into a coating tank for electrophoretic powder coating comprising:

a first step for transferring into a solid/liquid separation tank a proper amount of plating bath liquid contained in the coating tank of which the binder component is reduced as a result of the work for coating a given number of articles to be coated;

a second step in which the bath liquid in the solid/liquid separation tank is left as it is for a given time period to permit a powder component in the bath liquid to precipitate so that the bath liquid is separated into a supernatant liquid and a residual liquid, said supernatant liquid having a powder component ratio less than a given value;

a third step in which the supernatant liquid in the solid/liquid separation tank is transferred into a supernatant liquid tank where it is reserved while being agitated;

a fourth step in which the residual liquid in the solid/liquid separation tank is returned to the coating tank while being agitated;

a fifth step in which mother binder liquid corresponding in amount to the reduced binder component is supplied from a mother binder liquid tank into a mixing tank;

a sixth step in which, following the fifth step, a given amount of supernatant liquid is supplied from the supernatant liquid tank into the mixing tank where it is mixed with the mother binder liquid while being agitated;

a seventh step in which, after the sixth step is completed, the plating bath liquid from the coating tank is supplied by a proper amount into the mixing tank while being agitated, to produce replenisher bath liquid; and

an eighth step in which the replenisher bath liquid is supplied from the mixing tank into the coating tank for replenishing the reduced binder component.

4,177,124

PROCESS FOR ELECTRODEPOSITION OF GRAFT COPOLYMER

Isidor Hazan, Clementon, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 902,887, May 9, 1978. This application Dec. 15, 1978, Ser. No. 969,930
Int. Cl.[2] C25D *13/06*
U.S. Cl. 204—181 C 3 Claims

1. In a process for electrocoating with paint a cathodically-charged substrate immersed in a coating bath containing an aqueous dispersion of said paint, said bath having a cathode zone containing said substrate and an anode zone containing a charged anode, the charged electrodes being maintained in electrical contact with each other by means of said bath, wherein said bath comprises a cationic film-forming polymer, an acidic ionizing agent, the improvement which comprises:

employing an organic acid which is volatile at temperatures used to crosslink the film-forming polymer as the acidic ionizing agent;

employing as the cationic film-forming polymer a graft copolymer comprising a mono-epoxide portion grafted onto an acrylic-amine backbone portion, which portions consist essentially of, by weight based on the graft copolymer about:

(a) 25–60% of an acrylic-amine backbone copolymer contributing:

14.7–35% of secondary amine acrylate or methacrylate, giving 0.08 to 0.2 equivalent of tertiary amine per 100 grams of graft copolymer,

7–17% of hydroxy-functional acrylate or methacrylate,

3–7.3% ethyl acrylate or methyl methacrylate, and

0.3–0.7% mercaptoethanol, giving primary terminal hydroxyl functionality,

graft copolymerized with (b) and (c):

(b) 33–60% of an epoxy-fatty acid copolymer of a condensation polymer of equimolar proportions of epichlorohydrin and bisphenol A, said condensation polymer being reacted with fatty acid in the range of 1/1.4–1.7, and

(c) 7–15% of a glycidyl ester of a tertiary carboxylic acid containing 7 to 9 carbon atoms,

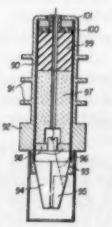
and subsequently curing the paint to crosslink the film-forming polymers.

4,177,125

ELECTROCHEMICAL DETECTOR OF THE OXYGEN CONTENT OF THE EXHAUST GASES OF COMBUSTION ENGINES

Jean-Louis M. Barnabé, Le Vesinet, France, assignor to Regie Nationale des Usines Renault, Boulogne-Billancourt, France

Filed May 25, 1978, Ser. No. 909,494
Claims priority, application France, May 25, 1977, 77 15916
Int. Cl.[2] G01N *27/46*
U.S. Cl. 204—195 S 6 Claims



1. An electronic detector for detecting the oxygen content of the burned gases of a combustion engine, said detector comprising:

two electrode bodies on the surface of a porous ceramic body, said porous ceramic body being composed of zirco-

nium oxide stabilized with between 8% and 14% yttrium oxide;

one of said electrodes being composed of a metal exhibiting no catalytic activity;

the other of said electrodes being composed of porous platinum of a thickness between 0.5 and 2μ;

said ceramic body being defined by a body of revolution which is positioned in a metallic housing; said metallic housing being attached to an exhaust manifold and having at least one passage for at least one lead connected to at least one of said electrodes, said ceramic body being held in said metallic housing in a semi-rigid condition by an elastic packing;

a silicone rubber plug located in the coolest part of said housing body for damping vibrations and compensating for thermal expansion; and

cooling fins on said housing for avoiding overheating of said plug;

wherein said electrodes are located in the flow of burned gases and the richness of carburization is measured by determining the difference in potential between the electrode exhibiting a significant catalytic activity and that exhibiting none.

4,177,126

REFERENCE ELECTRODE

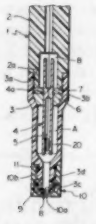
Masakatu Imaki; Hidehiko Hagiwara, and Seiji Usui, all of Kyoto, Japan, assignors to Horiba, Ltd., Japan

Filed Jun. 20, 1978, Ser. No. 917,352

Claims priority, application Japan, Jun. 20, 1977, 52/80962[U]

Int. Cl.[2] G01N *27/28, 27/40*

U.S. Cl. 204—195 F **3 Claims**



1. A reference electrode for use in testing or measuring serum or blood samples, said reference electrode comprising:

a cylindrical holder member including a cylindrical upper holder having upper and lower ends and a cylindrical lower holder having upper and lower ends, said lower end of said upper holder and said upper end of said lower holder being joined by meshing screw threads;

said lower holder having an interior forming a chamber for containing a reference liquid;

an inner electrode positioned within said chamber, said inner electrode being connected to an electric lead extending through said upper end of said upper holder;

means for spporting said inner electrode within said chamber and for sealing said chamber adjacent said upper end of said lower holder;

a liquid junction comprising a hydrophilic polypropylene membrane coated with a surface active agent, said membrane including a flat portion abutted against and closing said lower end of said lower holder and a tubular flange portion integral with and extending from said flat portion, said tubular flange portion fitting about an exterior surface adjacent said lower end of said lower holder; and

a removable push ring surrounding said tubular flange portion and pressing said tubular flange portion tightly against said exterior surface.

4,177,127

DEVICE FOR THE PRODUCTION OF ANODIZED MATERIAL

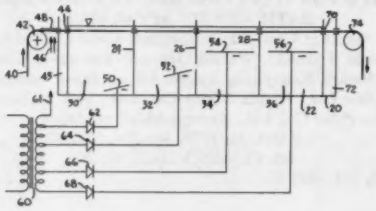
Harald Severus-Laubenfeld, Winterthur, Switzerland, assignor to Swiss Aluminium Ltd., Chippis, Switzerland

Division of Ser. No. 764,001, Jan. 31, 1977, Pat. No. 4,158,079, which is a continuation of Ser. No. 489,417, Jul. 17, 1974, abandoned. This application Jul. 20, 1978, Ser. No. 926,280

Claims priority, application Fed. Rep. of Germany, Aug. 13, 1973, 2340962

Int. Cl.[2] C25D *1/04, 11/04*

U.S. Cl. 204—207 **12 Claims**



1. A device for the production of anodized aluminum or aluminum alloy foil which comprises: a strip of said foil; an electrolyte bath and an entry point to said bath; an anode roll spaced from said entry point and bath over which the foil passes on its way to said entry point and bath; cooling means for cooling the foil between said anode roll and point of entry; and at least one cathode in said electrolyte bath through which the foil passes, whereby deformation due to excessive heating is avoided.

4,177,128

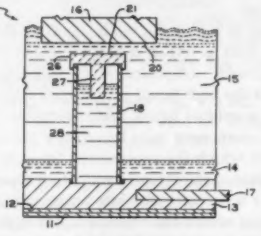
CATHODE ELEMENT FOR USE IN ALUMINUM REDUCTION CELL

Henry W. Rahn, Pittsburgh, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 20, 1978, Ser. No. 971,605

Int. Cl.[2] C25C *3/00, 3/06, 3/16*

U.S. Cl. 204—243 R **5 Claims**

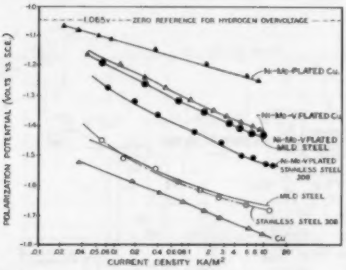


1. In an electrolytic cell wherein metal is produced in the molten state by electrolyzing a compound of the metal between anodic and cathodic surfaces said molten metal collecting in a pad on the floor of the cell the improvement wherein said cathodic surface is provided by a cathode element comprising at least one elongated hollow body having confined therein a quantity of molten metal, said hollow body extending upwardly through the molten metal pad and terminating proximate the anodic surface, the end of said hollow body terminating proximate the anodic surface being provided with a cap element formed of an electrically conductive material, the upper surface of the cap element confronting the surface of the anode in spaced relationship thereto, the cap element being in electrically conductive communication with the molten metal confined within the hollow body.

4,177,129
PLATED METALLIC CATHODE

Han C. Kuo, Cleveland, Tenn., assignor to Olin Corporation, New Haven, Conn.

Division of Ser. No. 892,554, Apr. 3, 1978. This application Nov. 1, 1978, Ser. No. 956,557
Int. Cl.[2] C25B *11/04*
U.S. Cl. 204—290 R 3 Claims

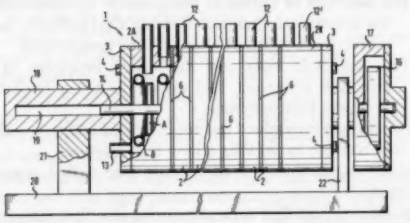


1. A low overvoltage cathode for an electrolytic cell, said cathode comprising a support formed from a metal selected from the group consisting of copper and a copper base alloy, at least a portion of which is conductively covered by a catalytic coating of a thickness within the range from about 1 to about 5 μm thick of an alloy consisting essentially of more than 50 percent molybdenum alloyed with a metal selected from the group consisting of cobalt and nickel so that the hydrogen overvoltage of said low overvoltage cathode in a chlor-alkali cell is reduced to less than 200 millivolts when tested in 20 percent caustic soda at 80° C. at 20 amp/dm^2 cathode current density.

4,177,130
APPARATUS FOR SEPARATING IONS PRESENT AS SOLUTES

Fritz Herrmann, Bruchwiesenweg 15, D-6450 Hanau 9, and Abdel-Latif Bilal, Kaiserdamm 88, D-1000 Berlin 19, both of Fed. Rep. of Germany

Filed Oct. 11, 1978, Ser. No. 950,363
Claims priority, application Fed. Rep. of Germany, Oct. 13, 1977, 2746089
Int. Cl.[2] B01D *13/02;* C02B *1/82*
U.S. Cl. 204—299 R 10 Claims



1. Apparatus for separating ions present as solutes in a solution comprising:

(a) a separating column having an axis and extending in a closed loop about said axis to define a cavity, said column being capable of holding said solution in said cavity;

(b) a plurality of partitions permeable to said solution and axially dividing said cavity into a plurality of chambers,

(1) the portions of said column exposed to said solution in said cavity and said partitions consisting of electrically insulating material; and

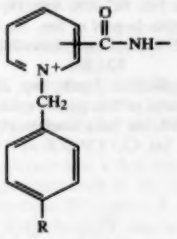
(c) two electrodes in respective, axially spaced chambers.

4,177,131
METHOD FOR OBTAINING BRIGHT ZINC AND CADMIUM ELECTROPLATES USING CARBOXAMIDE ADDITIVES

Reuven Merker, Englewood Cliffs, and Salvatore Lucca, Paramus, both of N.J., assignors to The Metalux Corporation, Carlstadt, N.J.

Continuation-in-part of Ser. No. 835,296, Sep. 21, 1977, abandoned, which is a continuation-in-part of Ser. No. 688,270, May 20, 1976, abandoned. This application Jul. 24, 1978, Ser. No. 927,419
Int. Cl.[2] C25D *3/24, 3/28*
U.S. Cl. 204—50 Y 15 Claims

1. In an aqueous alkaline electroplating bath containing metal ions selected from the group consisting of zinc and cadmium, the improvement which comprises having present in the bath from about 0.01 grams per liter to saturation of an inner salt of a quaternized pyridine carboxamide having the formula

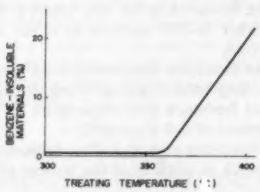


wherein R is hydrogen or a nicotinamide radical, said carboxamide being dissolved in the bath to yield a metal deposit of improved brightness.

4,177,132
PROCESS FOR THE CONTINUOUS PRODUCTION OF PETROLEUM-DERIVED PITCH

Seiichi Uemura; Syunichi Yamamoto, both of Kawasaki; Takao Hirose, Kamakura; Hiroaki Takashima, Kawasaki; Osamu Kato, Yokohama, and Minoru Nagi, Kawasaki, all of Japan, assignors to Nippon Oil Company, Ltd., Tokyo, Japan

Filed Nov. 8, 1977, Ser. No. 849,701
Claims priority, application Japan, Nov. 12, 1976, 51-135236
Int. Cl.[2] C10C *3/00*
U.S. Cl. 208—22 3 Claims



1. A process for the continuous production of petroleum-derived pitch consisting essentially of:

providing as the starting oil a heavy fraction boiling above 150° C., the heavy fraction being obtained by the steam cracking or thermocracking of petroleum-derived hydrocarbons.

feeding said heavy fraction continuously into a first-step agitating vessel maintained at a pressure of at least 2 Kg/cm^2 and a temperature of from 300° to 360° C., where the heavy fraction is heat treated for an average residence time of 15 minutes up to 5 hours,

withdrawing the first-step treated fraction continuously from the first-step agitating vessel,

feeding the thus-withdrawn first-step treated fraction continuously into a second-step agitating vessel maintained at a temperature of from 370° to 450° C., where the first-step treated fraction is heat treated for an average residence time of from 30 minutes to 10 hours,

withdrawing the second-step treated fraction continuously from the second-step agitating vessel and

removing the light fraction of boiling point below 400° C. from the second-step treated fraction, thereby to obtain the petroleum-derived pitch.

4,177,133
PROCESS FOR PRODUCING HIGH-CRYSTALLINE PETROLEUM COKE

Kiyoshige Hayashi, Tokyo; Mikio Nakaniwa, Ohme; Nobuyuki Kobayashi, Ichihara; Minoru Yamamoto, Ichichara, and Yoshihiko Hase, Ichihara, all of Japan, assignors to Maruzen Petrochemical Co., Ltd., Tokyo, Japan

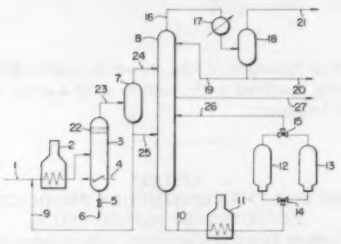
Continuation of Ser. No. 787,305, Apr. 14, 1977, abandoned, which is a continuation-in-part of Ser. No. 613,541, Sep. 15, 1975, Pat. No. 4,049,538. This application Jul. 14, 1978, Ser. No. 924,804

Claims priority, application Japan, Sep. 25, 1974, 49/110316

The portion of the term of this patent subsequent to Sep. 20, 1994, has been disclaimed.

Int. Cl.[2] C10G *9/14*

U.S. Cl. 208—50 **10 Claims**



1. A process for producing a high-crystalline petroleum coke from a petroleum feedstock containing a substantial amount of non-crystalline carbon-forming substances which comprises the steps of:

heating petroleum feedstock containing a substantial amount of non-crystalline carbon-forming substances in a tube heater to a temperature of 433°–520° C. under a pressure of 4–20 Kg/cm^2G;

maintaining the feedstock in the tube heater at that temperature for further 30–500 seconds to effect cracking and soaking thereof;

introducing the feedstock thus heat-treated into a high-temperature flashing column, and effecting therein flash distillation of said feedstock at a temperature of 380°–480° C. under a pressure of 0–2 Kg/cm^2G;

continuously removing non-crystalline substances contained in the feedstock as pitch from the bottom of the flashing column;

fractionating in a fractionating column the distillate from the flashing column into cracked gas, gasoline, gas oil and heavy residue; and

introducing the heavy residue, after heating to a temperature required for the subsequent delayed coking, into a coking drum, where it is subjected to delayed coking at a temperature of 430°–460° C. under a pressure of 4–20 Kg/cm^2G for at least 20 hours, thereby forming a high-crystalline petroleum coke having a coefficient of thermal expansion in the direction parallel to the extrusion of less than 1.0×10^{-6}/°C. over 100°–400° C. when measured in the form of an extruded graphite artefact thereof.

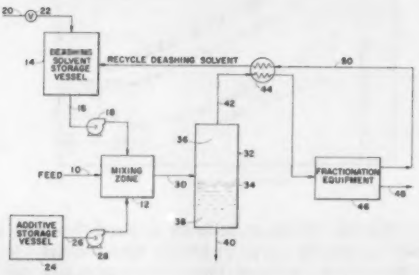
4,177,134
SEPARATION TECHNIQUE IN A COAL DEASHING PROCESS

Donald E. Rhodes; Roger A. Baldwin, and Robert E. Davis, all of Oklahoma City, Okla., assignors to Kerr-McGee Corporation, Oklahoma City, Okla.

Filed Mar. 20, 1978, Ser. No. 887,867

Int. Cl.[2] C10G *21/16*

U.S. Cl. 208—177 **12 Claims**



1. A process comprising:

providing a feed mixture comprising a deashing solvent, insoluble coal products and soluble coal products;

providing an additive, said additive consisting essentially of at least one substance selected from the group consisting of:

(i) asphaltenes derived either from petroleum, coal shale or tar sand, said asphaltenes being insoluble in aromatic hydrocarbons;

(ii) tannins;

(iii) "chlorophyll a" having the molecular formula $C_{55}H_{72}MgN_4O_5$;

(iv) "chlorophyll b" having the molecular formula $C_{55}H_{70}MgN_4O_6$;

(v) materials of chemical composition corresponding to the emphirical chemical formula $C_{61}H_{46}N_2O_4$, having molecular weights of about 870 or greater; and

(vi) asphaltols from coal dissolution processes or coal pyrolysis processes, said asphaltols being insoluble in aromatic hydrocarbons;

admixing predetermined quantities of said additive with said feed mixture to provide a new feed mixture;

introducing said new feed mixture into a first separation zone;

maintaining said first separation zone at a first temperature level lower than about 750 degrees F. and a pressure level in a range of from about 600 psig to about 1500 psig to separate said new feed mixture in said first separation zone into a first heavy fraction comprising the insoluble coal products, some deashing solvent, some soluble coal products and at least a portion of the additive and a light fraction comprising the deashing solvent and soluble coal products;

withdrawing said first heavy fraction from said first separation zone; and

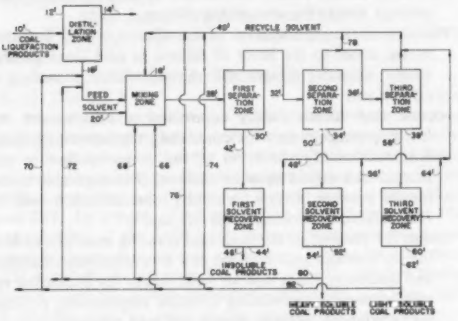
withdrawing said first light fraction from said first separation zone.

4,177,135

USE OF SPECIFIC COAL COMPONENTS TO IMPROVE SOLUBLE COAL PRODUCT YIELD IN A COAL DEASHING PROCESS

Donald E. Rhodes, Oklahoma City, Okla., assignor to Kerr-McGee Corporation, Oklahoma City, Okla.

Filed Mar. 20, 1978, Ser. No. 887,926
Int. Cl.[2] C10G *21/14*
U.S. Cl. 208—177 **14 Claims**



1. A coal liquid deashing process comprising:

providing a feed comprising soluble coal products and insoluble coal products;

providing a solvent, said solvent consisting essentially of at least one substance having a critical temperature below 800 degrees F. selected from the group consisting of aromatic hydrocarbons having a single benzene nucleus and normal boiling points below about 310 degrees F., cycloparaffin hydrocarbons having normal boiling points below about 310 degrees F., open chain mono-olefin hydrocarbons having normal boiling points below about 310 degrees F., open chain saturated hydrocarbons having normal boiling points below about 310 degrees F., mono-, di, and tri-open chain amines containing from about 2–8 carbon atoms, carbocyclic amines having a monocyclic structure containing from about 6–9 carbon atoms, heterocyclic amines containing from about 5–9 carbon atoms, and phenols containing from about 6–9 carbon atoms and their homologs;

providing an additive comprising recycled heavy soluble coal products;

admixing the feed, solvent and additive to form a mixture, said additive being present in said mixture in a quantity sufficient to provide a ratio by weight of feed to additive of from about 1:5 to about 20:1;

introducing said mixture into a first separation zone maintained at a temperature level in the range of from about 400 degrees F. to about 700 degrees F. and a pressure level in the range of from about 600 psig to about 1500 psig to effect a separation of said mixture into a first light phase and a first heavy phase comprising insoluble coal products and some solvent;

withdrawing said first light phase from said first separation zone, said first light phase containing soluble coal products extracted from the insoluble coal products by the interaction of said additive with said feed and solvent;

introducing said first light phase from said first separation zone into a second separation zone maintained at a temperature level above the temperature level of said first separation zone and a pressure level substantially no greater than the pressure level in said first separation zone to effect a separation of said first light phase into a second light phase comprising light soluble coal products and solvent and a second heavy phase comprising heavy soluble coal products and some solvent;

withdrawing said second heavy phase from said second separation zone as a product of the process; and

recycling at least a portion of said heavy soluble coal products in said second heavy phase to provide said additive in said mixture being introduced into said first separation zone.

3. A coal liquid deashing process comprising:

providing a feed comprising soluble coal products and insoluble coal products;

providing a solvent, said solvent consisting essentially of at least one substance having a critical temperature below 800 degrees F. selected from the group consisting of aromatic hydrocarbons having a single benzene nucleus and normal boiling points below about 310 degrees F., cycloparaffin hydrocarbons having normal boiling points below about 310 degrees F., open chain mono-olefin hydrocarbons having normal boiling points below about 310 degrees F., open chain saturated hydrocarbons having normal boiling points below about 310 degrees F., mono-, di, and tri-open chain amines containing from about 2–8 carbon atoms, carbocyclic amines having a monocyclic structure containing from about 6–9 carbon atoms, heterocyclic amines containing from about 5–9 carbon atoms, and phenols containing from about 6–9 carbon atoms and their homologs;

providing an additive comprising recycled light soluble coal products;

admixing said feed, solvent and additive to form a mixture, said additive being present in said mixture in a quantity sufficient to provide a ratio by weight of feed to additive of from about 1:5 to 20:1;

introducing said mixture into a first separation zone maintained at a temperature level in the range of from about 400 degrees F. to about 700 degrees F. and a pressure level in the range of from about 600 psig to about 1500 psig to effect a separation of said mixture into a first light phase and a first heavy phase comprising insoluble coal products and some solvent;

withdrawing said first light phase from said first separation zone, said first light phase containing soluble coal products extracted from the insoluble coal products by the interaction of said additive with said feed and solvent;

introducing said first light phase from said first separation zone into a second separation zone maintained at a temperature level above the temperature level of said first separation zone and a pressure level substantially no greater than the pressure level in said first separation zone to effect a separation of said first light phase into a second light phase and a second heavy phase comprising heavy soluble coal products and some solvent;

introducing the second light phase from said second separation zone into a third separation zone;

separating said second light phase in said third separation zone into a third light phase comprising solvent and a third heavy phase comprising light soluble coal products;

withdrawing said third heavy phase from said third separation zone as a product of the process; and

recycling at least a portion of said light soluble coal products to provide said additive in said mixture being introduced into said first separation zone.

4,177,136

HYDROTREATING PROCESS UTILIZING ELEMENTAL SULFUR FOR PRESULFIDING THE CATALYST

Daniel R. Herrington, Chesterland, and Albert P. Schwerko, Solon, both of Ohio, assignors to The Standard Oil Company (Ohio), Cleveland, Ohio

Division of Ser. No. 866,208, Jan. 3, 1978. This application May 12, 1978, Ser. No. 905,322
Int. Cl.[2] C10G *23/02*
U.S. Cl. 208—215 **6 Claims**

1. In a process of hydrotreating a hydrocarbon feed stock, which contains compounds with carbon-sulfur bonds, carbon-nitrogen bonds, and carbon-oxygen bonds, by contacting the hydrocarbon feed stock with hydrogen at an elevated temperature and with a hydrotreating catalyst to remove sulfur, nitro-

gen and oxygen from the hydrocarbon feed stock the improvement comprising using as at least part of a sulfided catalyst, a supported metal oxide catalyst, wherein said supported metal oxide catalyst is presulfided by the step of:

contacting said supported metal oxide catalyst with elemental sulfur in the absence of hydrogen in such a manner that said elemental sulfur is at least partially incorporated in the pores of said catalyst.

4,177,137

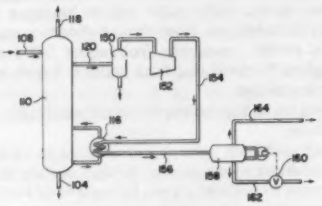
AROMATICS EXTRACTION PROCESS

Larry W. Kruse, Strongsville, Ohio, assignor to Standard Oil Company, Cleveland, Ohio

Filed Nov. 7, 1977, Ser. No. 849,299

Int. Cl.[2] C10G *21/28*

U.S. Cl. 208—321 **8 Claims**



1. In the process for recovery of aromatics from a petroleum fraction containing aromatics, comprising a first column wherein a solent is contacted with the petroleum fraction to extract aromatics therefrom, and a second column wherein the aromatics are stripped from the solvent, the improvement comprising removing a vapor sidestream containing aromatics from the upper half of the second column, compressing said sidestream containing aromatics, and passing said compressed sidestream in indirect heat exchange with the second column to provide at least part of the heat necessary to strip the aromatics from the solvent.

4,177,138

DIALYSIS METHOD AND APPARATUS THEREFOR

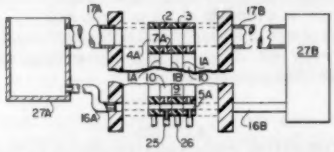
Harumi Mastuzaki, Hitachi; Katsuya Ebara, Mito, and Sankichi Takahashi, Hitachi, all of Japan, assignors to Hitachi Plant Engineering & Construction Co., Ltd. and Hitachi, Ltd., both of Tokyo, Japan

Filed May 26, 1977, Ser. No. 800,970

Claims priority, application Japan, May 26, 1976, 51-60162

Int. Cl.[2] B01D *13/02, 13/00*

U.S. Cl. 210—22 C **6 Claims**



4. A dialysis apparatus comprising:

a plurality of ion exchange membranes arranged vertically with predetermined intervals therebetween;

a plurality of frame members having peripheral portions, said ion exchange membranes and said frame members arranged alternately and secured tightly at the peripheral portions to define thereby a plurality of dilution chambers and concentration chambers alternately;

first and second passage means defined in the lower portions of said frame members for introducing solution into said dilution and concentration chambers respectively;

third and fourth passage means defined in the upper portions of said frame members for discharging diluent in said dilution chambers and concentrate in said concentration chambers therefrom respectively;

a plurality of aerating conduits provided in lower portions of said dilution and concentration chambers for introducing air into each of said dilution and concentration chambers;

a plurality of air vent means provided in the upper portions of said dilution and concentration chambers for discharging air introduced in said dilution and concentration chambers out of said dilution and concentration chambers;

first tank means fluidly connected to said first and third passage means for containing diluent;

means maintaining the level of the diluent in said first tank means equal to the level of diluent in said third passage means, whereby diluent will be recirculated according to air lift; and

second tank means fluidly connected to said second and fourth passage means for containing therein concentrate;

means maintaining the level of the concentration in said second tank means equal to the level of concentrate in said fourth passage means, whereby concentration will be recirculated according to air lift; and

means for passing air through said aerating conduits to bubble up through said dilution and concentration chambers and discharge from said air vent means for providing the sole means for circulating solution respectively through said chambers, passage means and tank means.

4,177,139

PROCESS FOR TREATING PARTICLES OF ADSORBENT USED TO REMOVE PHENOL FROM WASTE WATER

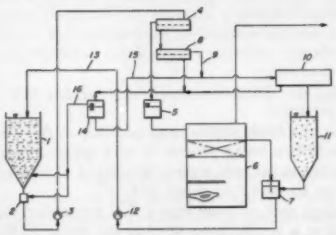
Ulrich Hahn, Dortmund, and Klaus Stumpe, Essen, both of Fed. Rep. of Germany, assignors to C. Otto & Comp. G.m.b.H., Bochum, Fed. Rep. of Germany

Filed Jan. 18, 1978, Ser. No. 870,389

Claims priority, application Fed. Rep. of Germany, Jan. 18, 1977, 27018151

Int. Cl.[2] B01D *15/06*

U.S. Cl. 210—33 **6 Claims**



1. In a process for removing phenol from waste water by passing phenol-bearing waste water through an adsorber filled with an adsorbent of active carbon or aluminum oxide having a desired given nominal particle size, the process for regenerating said adsorbent including the steps of:

discharging said adsorbent from said adsorber,

draining waste water from the discharged adsorbent,

separating the adsorbent into a first adsorbent fraction including adsorbent particles having said given nominal particle size and into an undersized second adsorbent fraction consisting of adsorbent particles having a size less than the given nominal particle size but a particle size which is greater than 10% of the given nominal particle size,

feeding said first adsorbent fraction into a regenerator oven,

regenerating the first adsorbent fraction by heating within said regenerator oven,

feeding said undersized second adsorbent fraction into a processing plant,

processing the undersized second adsorbent fraction in said

processing plant until the processed adsorbent particles define said given nominal particle size, and

returning said regenerated adsorbent particles together with said processed adsorbent particles into said adsorber.

4,177,140

METHOD FOR REMOVING A WEAK ACID FROM AN AQUEOUS SOLUTION

Robert Smakman, Nigtevecht, Netherlands, assignor to Akzona Inc., Asheville, N.C.

Filed Jan. 27, 1978, Ser. No. 872,843

Claims priority, application Netherlands, Jan. 26, 1977, 7700763

Int. Cl.[2] C02B *1/60*

U.S. Cl. 210—37 R **6 Claims**

4. A method for removing a weak acid from an aqueous solution containing said acid, comprising contacting said solution with an anion exchanger containing both strongly basic and weakly basic groups, said exchanger having a cross-linked matrix comprising a copolymer of styrene and not more than about 20%, by weight, of a cross-linking agent, from about 3% to about 90% of the total basic groups being strongly basic groups of the quaternary ammonium type having the structure $-CH_2N^+R_1R_2R_3$, wherein R_1, R_2, and R_3 are independently selected from the group consisting of $-CH_3$, $-C_2H_5$, and $-C_2H_4OH$, and the ratio of the number of strongly basic groups to the number of weakly basic groups is from about 3:97 to about 90:10.

4,177,141

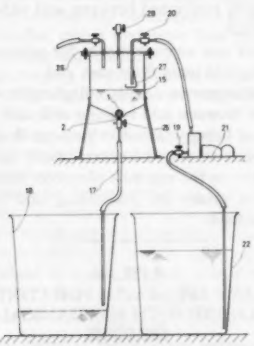
FILTER MEDIUM, PROCESS FOR PREPARATION THEREOF, FILTERING METHOD AND FILTERING APPARATUS

Akio Nakamura, 4-6, Inohana 3, and Hirosi Isizuka, 48, Minatocho, both of Chiba City, Chiba Pref., Japan

Filed Mar. 30, 1978, Ser. No. 891,919

Int. Cl.[2] B01D *37/02*

U.S. Cl. 210—70 **7 Claims**



1. In a method for separating at least one filtrate from a dispersed phase using a filter medium comprising a body of the filter medium having the space thereof partitioned three-dimensionally, irregularly and manifoldly by bent linear members having a strength sufficient to prevent substantially any deformation when the filtrate flows therethrough, such that voids are formed wherein the filtrate passes through said voids, and an effluent pipe connected to the body of the filter medium and having an opening located in the interior of the body of the filter medium, the filtrate flowing out of said filter medium through said effluent pipes the improvement comprising, pre-impregnating said filter medium body with dispersed phase free filtrate such that said filter medium is completely immersed in said filtrate and thereafter feeding a flow of said filtrate with said dispersed phase therein towards the surface of said filter medium body so as to provide a constant and steady operation state wherein said filtrate continues to flow through said filter medium body and through said effluent pipe and said dispersed phase is formed around said filter medium body but separated therefrom with the filtrate interposed between the dispersed phase and the surface of the filter medium body.

4,177,142

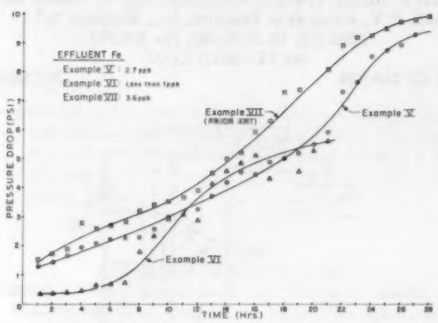
MIXTURE OF OPPOSITELY CHARGED FILTER AID MATERIAL

Christopher J. Halbfoster, Greenbrook, N.J., assignor to Ecodyne Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 457,821, Apr. 4, 1974, abandoned. This application Sep. 27, 1977, Ser. No. 836,967

Int. Cl.[2] B01D *37/02*

U.S. Cl. 210—75 **24 Claims**



1. A method for removing impurities from a liquid comprising: passing said liquid through a filter bed comprising a mixture of oppositely charged particles of filter aid material, said mixture producing a clumping phenomenon, said particles normally all having the same surface charge in aqueous suspension, wherein 5 to 95% of said material has been treated with an electrolyte-type compound that produces a surface charge opposite to said normal surface charge by bonding to the surface of said filter aid material.

4,177,143

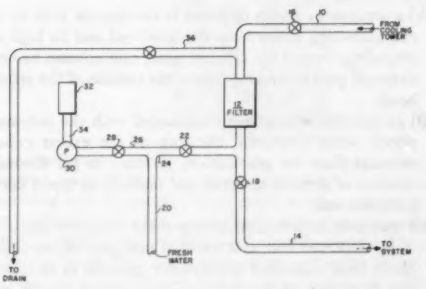
ELIMINATION OF STRAINER FOULING IN RECIRCULATING COOLING WATER SYSTEMS

Richard E. Myers, Hinsdale, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.

Filed Oct. 25, 1978, Ser. No. 954,717

Int. Cl.[2] B01D *29/38*

U.S. Cl. 210—82 **4 Claims**



1. A method of improving the operation of filters of the type used to filter cooling waters which are used intermittently in direct heat exchange relationship to cool large office buildings and similar structures, which method comprises maintaining the filters when not in use in contact with water which con-

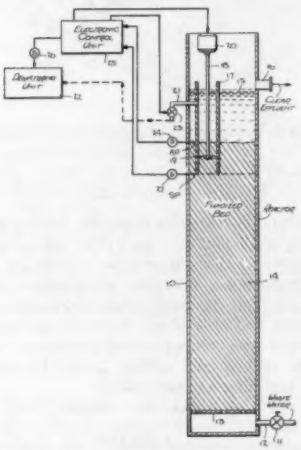
tains a preservative amount of an industrial biocide, said preservative amount being greater than the normal dosage used to treat the cooling water under conditions of normal operation.

4,177,144

EXCESS-GROWTH CONTROL SYSTEM FOR FLUIDIZED-BED REACTOR

Robert F. Hickey, Florence, Mass., and Roger W. Owens, Deer Park, N.Y., assignors to Ecolotrol, Inc., Bethpage, N.Y.

Filed Jul. 19, 1978, Ser. No. 926,207
Int. Cl.[2] B01D *15/02*
U.S. Cl. 210—86 **20 Claims**



1. A control system for preventing accumulation of excessive cellular material in a fluidized-bed reactor wherein waste water or other liquid to be processed is conducted upwardly therein at a velocity conducive to fluidization through a bed of particles which function as a carrier for the growth of the material, a head of effluent being developed above the bed from which the effluent is discharged from the reactor; the system comprising:

(A) a separator column disposed in the reactor with its low end extending toward the fluidized bed and its high end extending toward the effluent head, said column having a draw-off port somewhat below the surface of the effluent head;

(B) an agitator arrangement associated with the column to effect, when activated, shearing of the excess cellular material from the particles to produce in the column a mixture of sheared material and partially-stripped carrier particles; and

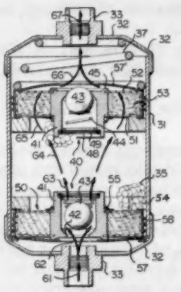
(C) means to activate said arrangement when the expansion of the fluidized bed, as a result of said growth, reaches an alarm limit indicative of excessive growth, to provide an exit flow rate at the draw-off port which results in an upward flow velocity in the separator column that is lower than the settling velocity of the partially-stripped carrier particles but higher than the settling velocity of the sheared material whereby the sheared material is washed away through the draw-off port.

4,177,145

TWO-WAY FILTER-DRIER FOR HEAT PUMP SYSTEMS

Ernest W. Schumacher, De Soto, Tex., assignor to Virginia Chemicals Inc., Portsmouth, Va.

Filed May 3, 1978, Ser. No. 902,398
Int. Cl.[2] B01D *15/00*
U.S. Cl. 210—136 **21 Claims**



1. A bi-directional filter-drier, comprising:

A. a shell having line connectors at each end thereof;

B. an adsorption/filtration unit, comprising:

(1) an adsorption space filled with an adsorbent;

(2) a valve assembly at each end of said adsorption space, each comprising:

(a) a valve bushing having a passageway therethrough, and

(b) a check valve within said passageway for allowing flow of liquid therethrough only from one said line connector toward said adsorption space, and

(3) a pad assembly at each end of said adsorption space, each comprising:

(a) a main filter pad which is radially disposed and is annularly positioned between said valve bushing and said shell;

(b) a filter pad support means for positioning and supporting said main filter pad, and

(c) an elastomeric annular diaphragm which is positioned between said bushing and said shell, said diaphragm being adapted to prevent flow in the direction permitted by the nearer check valve and to permit flow in the opposite direction thereto; and

C. a retaining means for positioning said adsorption unit within said shell.

4,177,146

METHODS AND APPARATUS FOR CONTINUOUSLY ENDOWING LIQUID WITH MECHANICAL ENERGY BY OSMOSIS

Karel Popper, P.O. Box 637, Willits, Calif. 95490, and Wayne M. Camirand, 844 Madison St., Albany, Calif. 94706

Filed May 5, 1975, Ser. No. 574,302
Int. Cl.[2] B01D *13/00*
U.S. Cl. 210—137 **3 Claims**

1. Apparatus for endowing liquid with energy by osmosis comprising an osmosis cell including an osmotic membrane and a sealed chamber having the hypertonic surface of said membrane as one of its boundaries;

a lock-type valve for feeding solid solute into said sealed chamber;

a governable outlet for said chamber from which liquid can issue;

means for creating turbulence in liquid within said chamber; and

the hypotonic surface of said membrane being so exposed and said apparatus being adapted to be so oriented that

liquid can flow against and the away from the hypotonic surface under the action of gravity.

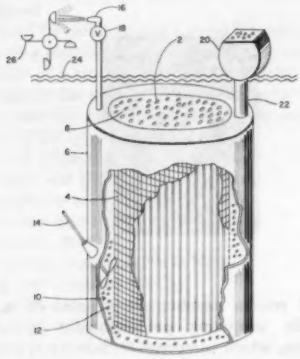
2. Apparatus for endowing liquid with energy by osmosis comprising an osmosis cell;

means for continuously flowing hypotonic liquid against and then away from the hypotonic surface of the membrane of said cell;

means for continuously flowing hypertonic liquid against the hypertonic surface of said membrane;

means for, at least in part, then flowing said hypertonic liquid together with permeate emerging across said membrane, away from said membrane to a prime mover to drive said prime mover;

means for causing said liquid, as it issues from said prime mover, to evaporate into the atmosphere, at least in part, so as to produce solute in solid form from said liquid;



means for embodying said solute in a relatively concentrated liquid constituting a source of the hypertonic liquid for said second mentioned means to flow against said hypertonic surface of said membrane, said means for embodying said solute in a relatively concentrated liquid comprising a closed chamber and a lock-type feed valve for feeding solid solute into said chamber;

means for conveying to said feed valve for feeding to said chamber solid solute formed by evaporation of the effluent from said prime mover;

means for flowing a part of the hypertonic liquid and permeate away from said hypertonic surface into said closed chamber; and

means for supplying hypertonic liquid from said chamber to said means for continuously flowing hypertonic liquid against said membrane, all of said five means immediately hereinbefore mentioned, except said conveying means, being arranged in a pressure-tight closed system.

4,177,147

BIOLOGICAL TREATING SYSTEMS

Robert L. Roberts, Boothwyn, Pa., assignor to Roberts Filter Manufacturing Company, Darby, Pa.

Filed Mar. 20, 1978, Ser. No. 887,952
Int. Cl.[2] C02C *1/04*
U.S. Cl. 210—151 **15 Claims**

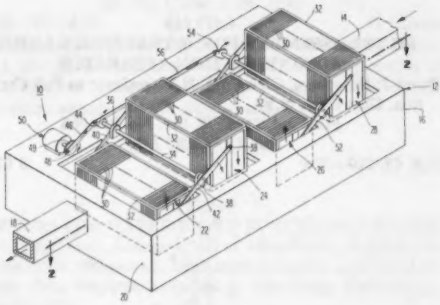
1. An aerobic biological treating system for wastewater, said system including:

a treating tank for wastewater having inlet means for receiving wastewater to be aerobically treated and outlet means for receiving the aerobically treated wastewater;

at least two pairs of wastewater contacting units, said units including surfaces for encouraging the growth of biological slimes thereon;

first connecting means joining one pair of units together for reciprocating motion to permit each unit of said one pair to alternately move into and out of the wastewater;

second connecting means joining a second pair of units together for reciprocating motion to permit each unit of the second pair to alternately move into and out of the wastewater; and



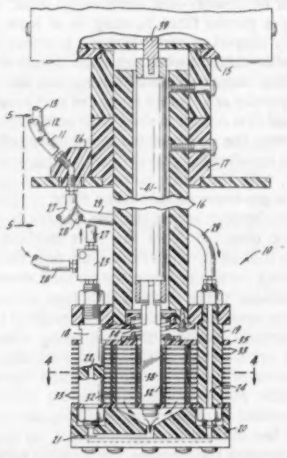
drive means for reciprocating the first and second connecting means to alternately move each unit of each pair into and out of the wastewater as said wastewater is being directed through the tank from said inlet means to said outlet means.

4,177,148

MECHANICAL STRAINER

Clifford C. Hach, Ames, Iowa, and Wayne P. Zemke, Port Washington, Wis., assignors to Hach Chemical Company, Loveland, Colo.

Filed Mar. 3, 1978, Ser. No. 883,205
Int. Cl.[2] B01D *33/00*
U.S. Cl. 210—396 **1 Claim**



1. A mechanical strainer comprising, in combination, a frame including an end plate, said frame including a pair of posts supporting said end plate, a shaft journaled for rotation in said frame, a plurality of perforated discs slidably but non-rotatably mounted on said shaft, a plurality of perforated blades sandwiched between said discs, said blades not being coupled to said shaft but slidably anchored for non-rotation on said end posts, means for urging the stack of interfitted discs and blades together and against said end plate completely enclosing the disc and blade perforations, means on said frame for slowly and continuously driving said shaft, said end plate being formed with a passage opening to the perforations in said discs and blades, and means including a passage through one of said

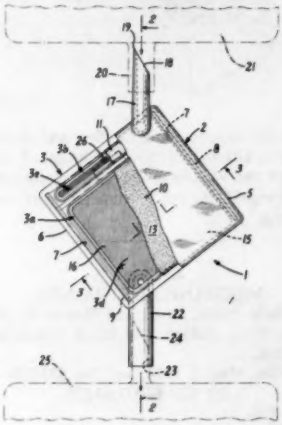
posts that opens to said end plate passage for coupling a tube to said passage so that water leaking between said relatively rotating discs and blades finds its way to said tube while foreign particulate matter is stopped at the peripheries of the discs and blades.

4,177,149

FILTER ASSEMBLY FOR INTRAVENOUS LIQUID ADMINISTRATION APPARATUS

David J. Rosenberg, Glen Cove, N.Y., assignor to Pall Corporation, Glen Cove, N.Y.

Filed Jul. 21, 1978, Ser. No. 926,766
Int. Cl.[2] C02C *1/14*
U.S. Cl. 210—436 **8 Claims**



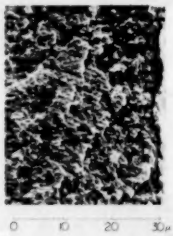
1. A filter for gravity-feed intravenous liquid administration, comprising a plastic filter housing in at least two generally rectilinearly shaped portions bonded together and defining a filter chamber therebetween; an inlet member located generally at a first corner of said housing and an outlet member located generally at a second corner of said housing diagonally opposite said first corner in fluid flow communication with the filter chamber, the inlet member being arranged to be oriented up when so installed for gravity feed of intravenous liquid from the supply, with the outlet member down; a liquid-permeable filter that is gas-impermeable when filled with liquid disposed in the filter chamber across the line of gravity-feed fluid flow through the chamber from the inlet member to the outlet member so that all through flow must pass through the filter, and extending vertically when the pointed member is oriented up; the chamber being divided into two vertically-extending portions, one upstream and one downstream of the filter; a vent in an uppermost portion of the housing when the pointed member is oriented up, in flow communication with the upstream portion of the filter chamber; and a liquid-impermeable gas-permeable porous member extending vertically when the pointed member is oriented up and disposed above the filter across the line of flow through the vent, so that all vent flow must pass through the member, the member passing to the vent flow gas rising to the top of the upstream portion of the filter chamber and restricting such flow to gas to which it is permeable; the inlet member being shaped for attachment to a supply of liquid for intravenous administration; and the outlet member being shaped for attachment to an intravenous liquid administration apparatus, the upper walls of the filter chamber on the upstream side of the filter being arranged to funnel gas rising in the chamber towards the inlet member and vent, and to permit liquid flowing downwardly to spread out over the filter surface, the lower walls on the upstream side of the filter drawing inwardly towards the bottom of the chamber to maintain a uniform flow over the filter surface as the liquid diminishes in volume due to flow through the filter; and the lower walls of the filter chamber on the downstream side being arranged to funnel liquid flowing downwardly in the chamber towards the outlet member.

4,177,150

DRIED POROUS ACRYLONITRILE POLYMER MEMBRANE, PROCESS FOR PRODUCING SAME AND SEPARATORS MADE THEREFROM

Akio Inoue; Tadahiro Kobayashi, and Toshio Iwasa, all of Fuji, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 6, 1977, Ser. No. 831,017
Claims priority, application Japan, Sep. 8, 1976, 51/106613
Int. Cl.[2] B01D *13/04*
U.S. Cl. 210—500 M **1 Claim**



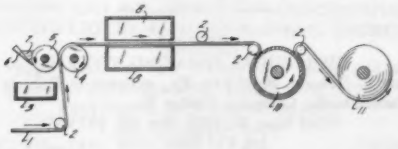
1. A dried porous membrane composed of acrylonitrile polymer walls separating predominantly interconnecting small-size pores, which comprises surface layers integral with a support layer to form a single continuous acrylonitrile polymer phase, each of the surface layers having pores of from 0.001 to 0.05 micron in average size and a thickness of from 0.1 to 20 microns, the support layer having pores of a larger average size than the pores in the surface layers, and said membrane having a porosity of from 20% to 70% by volume and a fragility of below 30.

4,177,151

FABRIC-CONDITIONING ARTICLE FOR USE IN A CLOTHES DRYER

Ting Y. Siu, Englishtown, and Daniel Ackley, Waldwick, both of N.J., assignors to Tenneco Chemicals, Inc., Saddle Brook, N.J.

Filed Jun. 30, 1978, Ser. No. 921,023
Int. Cl.[2] D06M *13/00*
U.S. Cl. 252—8.6 **23 Claims**



1. In a fabric-conditioning article comprising a flexible substrate carrying at least one fabric-conditioning agent and suitable for use by commingling with damp fabrics in a laundry dryer, the improvement wherein said substrate comprises a sheet of flexible, resilient, polyurethane foam having a density of from about 1.1 to about 1.8 pounds per cubic foot, a thickness of from about 0.025 inch to about 0.250 inch and a cell count of from about 20 to about 100 cells per linear inch, and at least one surface of said foam sheet has a discontinuous coating of said fabric- conditioning agent, said coating penetrating said surface to an average depth of no more than about

one-third the thickness of said sheet without extending appreciably above said surface and at least the center core of said sheet being free from said fabric-conditioning agent, the improvement providing more efficient utilization of said fabric-conditioning agent.

4,177,152

METHOD OF EXTINGUISHING METAL FIRES

Jean P. Sarrut, La Varenne St. Hilaire, France, assignor to CECA S.A., Villacoublay and Le Carbone Lorraine, Paris, both of, France

Filed Nov. 17, 1977, Ser. No. 852,238

Claims priority, application France, Nov. 22, 1976, 76 35125; Sep. 5, 1977, 77 26857

Int. Cl.[2] C09K *3/28;* G21C *9/04*

U.S. Cl. 252—2 **22 Claims**

1. A method for extinguishing a metal fire comprising isolating the burning metallic surface from the ambient atmosphere by application of a product comprising an exfoliable graphite complex wherein the graphite is associated with a complexing material or materials selected from the group consisting of

nitric acid (HNO_3)
sulfuric acid (H_2SO_4)
hydrofluoric acid (HF)
orthophosphoric acid (H_3PO_4)
trifluoroacetic acid (CF_3CO_2H)
ferric chloride ($Fe Cl_3$)
ferric chloride/ammonia ($FeCl_3 NH_3$)
antimony pentachloride ($SbCl_5$)
calcium ammonia ($Ca NH_3$)
barium/ammonia ($Ba NH_3$)
strontium/ammonia ($SrNH_3$),

and wherein exfoliation occurs when the product is applied to the metal fire.

15. A metal fire extinguishing product comprising an exfoliable graphite complex wherein the graphite is associated with a complexing material or materials selected from the group consisting of

nitric acid (HNO_3)
sulfuric acid (H_2SO_4)
hydrofluoric acid (HF)
orthophosphoric acid (H_3PO_4)
trifluoroacetic acid (CF_3CO_2H)
ferric chloride ($Fe Cl_3$)
ferric chloride/ammonia ($FeCl_3 NH_3$)
antimony pentachloride ($SbCl_5$)
calcium ammonia ($Ca NH_3$)
barium/ammonia ($Ba NH_3$)
strontium/ammonia ($Sr NH_3$),

and is exfoliable when the product is applied to the metal fire.

4,177,153

LUBRICATING OIL ADDITIVE COMPOSITION

Warren Lowe, El Cerrito, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Mar. 31, 1978, Ser. No. 892,446

Int. Cl.[2] C10M *1/48*

U.S. Cl. 252—32.7 E **10 Claims**

1. An additive composition for use in crankcase lubricating oils comprising:

(1) an oil-soluble antioxidant selected from aromatic or alkyl sulfides and polysulfides, sulfurized olefins, sulfurized carboxylic acid esters, and sulfurized ester-olefins, and

(2) an oil-soluble tertiary amine of the formula $(R)_3N$, wherein each R is independently C_1-C_{35} alkyl and at least one R contains at least 11 carbon atoms, wherein the weight ratio of said antioxidant to said tertiary amine is 1:0.001-21.

4,177,154

SYNTHETIC AQUEOUS BASED METAL WORKING FLUID COMPOSITIONS

Paritosh M. Chakrabarti, Wayne, N.J., assignor to GAF Corporation, New York, N.Y.

Filed Jun. 5, 1978, Ser. No. 912,438

Int. Cl.[2] C10M *1/46, 3/40*

U.S. Cl. 252—32.5 **11 Claims**

1. Synthetic metal working composition concentrates comprising phosphoric acid esters of poly (2-10) ethyleneoxy n butane 1,4-diols in aqueous solution having the pH of the composition adjusted to the alkaline side.

4,177,155

ADDITIVES FOR WATER-BASED FUNCTIONAL FLUIDS

Alan F. Popplewell, deceased, late of Manchester, England (by Margaret R. Popplewell, legal representative), and David R. Clark, Sale, England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

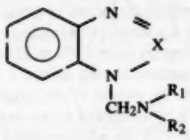
Continuation-in-part of Ser. No. 649,109, Jan. 14, 1976, abandoned. This application May 19, 1977, Ser. No. 798,517

Claims priority, application United Kingdom, Jan. 23, 1975, 2929/75

Int. Cl.[2] C07D *235/08, 249/18, 403/06*

U.S. Cl. 252—49.3 **24 Claims**

1. A compound having the formula



I

wherein

X is N or CR,

R is hydrogen or an alkyl of 1 to 4 carbon atoms,

R_1 and R_2 are the same or different and each is a residue of the formula

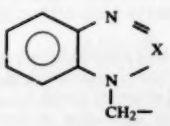
$R_3O[(alkylene)O]_xalkylene$,

R_3 is hydrogen or alkyl of 1 to 2 carbon atoms,

"alkylene" is a straight or branched chain alkylene of 2 to 3 carbon atoms,

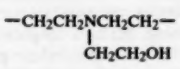
x is 0, 1, 2, 3 or 4; or

R_1 is said residue and R_2 is hydrogen, alkyl of 1 to 4 carbon atoms, cyclohexyl, benzyl or a radical of the formula



II;

or R_1 and R_2 together are



16. A composition comprising

(a) a water-based functional fluid, and

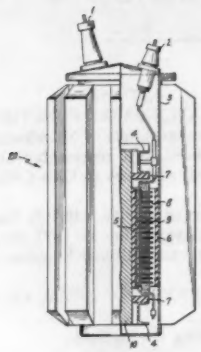
(b) from 0.001 to 5% by weight based on the total composition of a compound according to claim 1, said compound acting as a metal passivator.

24. A composition according to claim 16 wherein the functional fluid is a metal working fluid.

4,177,156
DIELECTRIC COMPOSITIONS COMPRISING MIXTURES OF POLYCHLORINATED BENZENES AND ALKYLAROMATIC HYDROCARBONS

Pierre Jay, Saint-Didier Au Mont D'Or, and Pierre Bonhomme, Meyzieu, both of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed Mar. 10, 1978, Ser. No. 885,381
Claims priority, application France, Mar. 10, 1977, 77 08080
Int. Cl.[2] C10M *3/24;* H01B *3/24, 3/22*
U.S. Cl. 252—66 19 Claims



1. A liquid, non-flammable dielectric composition, comprising [1] from 75% to 90% by weight of a mixture of polychlorobenzenes, which comprises (i) from 75% to 95% by weight an at least one polychlorobenzene having at least 3 chlorine atoms and (ii) from 25% to 5% by weight of orthodichlorobenzene, and [2] from 25% to 10% by weight of a member selected from the group consisting of (iii) an alkylaromatic hydrocarbon selected from the group consisting of a mono- or polyalkylbiphenyl, a mono- or polyalkylterphenyl, and mixtures thereof, and wherein each alkyl substituent contains from 1 to 5 carbon atoms, and (iv) a member selected from the group consisting of an at least 10% hydrogenated biphenyl and an at least 10% hydrogenated terphenyl.

4,177,157
PRECOAGULATED PTFE-BOUND ELECTRODES

Richard L. Adams, Ferndale, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 5, 1978, Ser. No. 893,695
Int. Cl.[2] H01M *4/62, 4/32, 4/52*
U.S. Cl. 252—182.1 2 Claims

1. In the process of making alkaline battery electrodes of the non-sintered, polymer-bound type including the principal steps of slurrying comminuted electrode active material and coagulated binder in a suitable suspension medium, filtering the slurry to remove said active material and binder from said medium as a filter cake, integrating said filter cake with a conductive current collector, compressing the current collector and cake, and drying the thusly formed compress, the improvement comprising: mixing a coagulant with an aqueous dispersion of fine polytetrafluoroethylene particles to form a coagulum of said particles; mechanically dispersing said coagulum in water such as to subdivide said coagulum into small irregularly shaped, sticky clots of said particles and suspend them in the water; and mixing the thusly formed aqueous suspension with said active material to form said slurry, whereby said clots become coated with said active material during said slurrying, and said coated clots interlock together during said compressing for forming a coherent mass thereof.

4,177,158
METHOD FOR PRODUCING AN ATTRITION-RESISTANT ADSORBENT FOR SULFUR DIOXIDE, THE RESULTING COMPOSITION AND A PROCESS USING SAME

Emanuel M. Blue, Walnut Creek, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Feb. 13, 1978, Ser. No. 877,434
Int. Cl.[2] B01D *53/12;* B01J *8/24;* C09K *3/00*
U.S. Cl. 252—189 12 Claims

1. A method for improving the attrition resistance of a particulate solid selected from limestone and dolomite comprising the steps of:

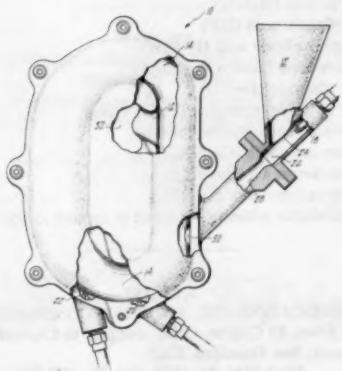
(a) forming a mixture of said particulate solid with a finely divided solid material including at least one glaze-forming flux having a melting point lower than said particulate solid selected from phosphates, silicates and borates of alkali and alkaline earth metals and oxides of boron, said mixture containing from 0.002 to 1 part, by weight, of said finely divided solid per 100 parts of said particulate solid; and

(b) glazing a fraction of the exterior of said particulate solid with said finely divided solid maintaining said mixture at a temperature below the melting temperature of said particulate solid and high enough to melt said flux for about 0.1 to 30 minutes in a fluidized bed.

4,177,159
CATALYTIC DRY POWDER MATERIAL FOR FUEL CELL ELECTRODES COMPRISING FLUOROCARBON POLYMER AND PRECATALYZED CARBON

Roger M. Singer, West Hartford, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Jun. 28, 1978, Ser. No. 920,035
Int. Cl.[2] B01J *31/02;* H01M *4/04, 4/96*
U.S. Cl. 252—428 5 Claims



1. A finely divided dry powder having a maximum particle size of about five microns and a mean particle size of about one micron or less, said powder comprising precatalyzed carbon and polytetrafluoroethylene, the polytetrafluoroethylene having a molecular weight of at least 10^6.

2. The finely divided powder according to claim 1 wherein said powder consists of floc particles formed by flocculating a co-suspension of said precatalyzed carbon particles and polytetrafluoroethylene particles, drying the floc so formed, and reducing the floc to a powder having said maximum particle size.

4,177,160

CATALYTIC COMPONENTS AND CATALYSTS FOR THE POLYMERIZATION OF OLEFINS

Giuliano Cecchin; Luciano Luciani, and Pier Luigi Griselli, all of Ferrara, Italy, assignors to Montedison S.p.A., Milan, Italy

Continuation of Ser. No. 712,306, Aug. 6, 1976, abandoned. This application Nov. 14, 1978, Ser. No. 960,664

Claims priority, application Italy, Aug. 8, 1975, 26231 A/75

Int. Cl.[2] C08F *4/64*

U.S. Cl. 252—429 B **8 Claims**

1. Catalyst-forming components for use in preparing catalysts for polymerization of olefins, said components consisting of a product of the following composition:

$$TiCl_3.(AlR_mX_{3-m})_aA_p$$

wherein:

R is a hydrocarbon radical containing from 1 to 20 carbon atoms;

$O \leqq m \leqq 2.5$;

X is halogen;

a is a number lower than 0.4;

A is an ether selected from the group consisting of monoethers of formula R'OR'' wherein R' and R'' are alkyls containing from 1 to 10 carbon atoms, aryls, cycloalkyls, alkylaryls or aralkyls, and polyethers of the class of polyalkylenglycol-dialkyl-ethers and 1,2-diphenoxyehtane, said ether being capable of forming complexes or coordination products with Al halides or alkyl-Al halides, which complexes or coordination products are soluble in the ether itself or in aromatic or aliphatic hydrocarbons or in the halogenated derivatives thereof; and

p is zero or a number greater than zero but lower than 0.5 and said catalyst-forming components being characterized in that, in the X-rays spectrum thereof, diffraction lines apper at the following lattice distances:

d=5.4 A (intense line); d=2.75 A (line of medium intensity);

d=2.12 A (line of medium to weak intensity);

d=1.98 A (very weak line); d=1.77 A (medium line), and in that the surface area thereof is comprised between 2 and 20 m^2/g and the porosity is lower than 0.1 cc/g.

4,177,161

CATALYTIC OXIDATIVE PROCESS FOR PRODUCING MALEIC ANHYDRIDE

Sumio Umemura; Kyoji Ohdan; Fumihiko Sakai; Yasuo Bando, and Harumi Ikezawa, all of Ube, Japan, assignors to Ube Industries, Ltd., Yamaguchi, Japan

Division of Ser. No. 816,916, Jul. 19, 1977, Pat. No. 4,110,350, which is a continuation of Ser. No. 623,448, Oct. 17, 1975, abandoned. This application May 5, 1978, Ser. No. 902,935

Claims priority, application Japan, Oct. 22, 1974, 49-121009; Jul. 1, 1975, 50-80527

Int. Cl.[2] B01J *27/14*

U.S. Cl. 252—435 **15 Claims**

1. Catalyst composition consisting essentially of oxides defined by the following formula:

$$VP_aTi_bX_cO_d$$

wherein said oxides of titanium and vanadium are the product of calcining a mixture of a vanadium-containing compound and titanium dioxide at a temperature of 650° to 1500° C., X is at least one element selected from the group consisting of sodium, calcium, magnesium, iron, zirconium, boron, manganese, silver and molybdenum, and "a" is 1.0 to 5.0, "b" is 2.0 to 12.0, "c" is 0 to 1.0, and "d" is a number within the range of 8 to 40 satisfying the average valency of the vanadium, phosphorous, titanium and X, wherein after calcining said titanium dioxide is rutile titanium dioxide.

4,177,162

SULFIDING AND REOXIDATION OF CHROMIUM CATALYST

Max P. McDaniel, and Melvin B. Welch, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 5, 1977, Ser. No. 857,556

Int. Cl.[2] B01J *27/02, 31/02, 31/12*

U.S. Cl. 252—439 **17 Claims**

1. A process for activating a catalyst consisting essentially of a chromium component and a silica-containing base comprising a first step wherein said catalyst is contacted with a sulfur-containing ambient at a temperature of at least 370° C. and a subsequent second step wherein it is contacted with an oxygen-containing oxidizing ambient at a temperature within the range of 400°-900° C.

4,177,163

SUPPORTED CATALYST FOR DEMETALATION AND DESULFURIZATION OF HYDROCARBON OILS

Stephen M. Oleck, Moorestown, and Howard S. Sherry, Cherry Hill, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Mar. 8, 1978, Ser. No. 884,521

Int. Cl.[2] B01J *23/10, 21/04, 23/84, 27/04*

U.S. Cl. 252—439 **13 Claims**

1. A catalyst for the hydrodemetalation of a metal and sulfur-contaminated hydrocarbon oil, said catalyst comprising 1–10% of an iron group metal and 5–25% of a Group VIB metal, said metals being present as the oxides or sulfides on a support precalcined at a temperature of about 1300° to about 1700° F., said precalcined support comprising at least 85 wt.% alumina and about 0.5 to about 7.0 wt.% rare earth oxide.

4,177,164

HYDROALKYLATION COMPOSITION AND PROCESS FOR PRODUCING SAID COMPOSITION

Timothy P. Murtha; William A. Jones, and Ernest A. Zuech, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 744,060, Nov. 22, 1976, Pat. No. 4,093,671. This application Dec. 28, 1977, Ser. No. 865,157

Int. Cl.[2] B01J *29/06*

U.S. Cl. 252—455 Z **13 Claims**

1. A composition comprising:

at least one platinum compound supported on a calcined, acidic, nickel and rare earth-treated crystalline zeolite wherein the rare earth content of the calcined, acidic, nickel and rare earth-treated crystalline zeolite is within a range of from about 2 to about 25 percent by weight of the composition.

4,177,165

HYDROALKYLATION COMPOSITION AND PROCESS FOR PRODUCING SAID COMPOSITION

Timothy P. Murtha, and Ernest A. Zuech, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 767,413, Feb. 10, 1977, Pat. No. 4,094,918. This application Dec. 28, 1977, Ser. No. 865,158

Int. Cl.[2] B01J *29/06*

U.S. Cl. 252—455 Z **21 Claims**

1. A composition comprising:

at least one rhodium or palladium compound or mixture thereof supported on a calcined, acidic, nickel and rare earth-treated crystalline zeolite; wherein the rare earth content of the calcined, acidic, nickel and rare earth-treated crystalline zeolite ranges from about 2 to about 25 percent by weight; and

wherein the nickel content of the calcined, acidic, nickel and rare earth-treated crystalline zeolite ranges from about 0.01 to about 12 percent by weight.

4,177,166

HYDROALKYLATION COMPOSITION AND PROCESS FOR PRODUCING SAID COMPOSITION

Timothy P. Murtha, and Ernest A. Zuech, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 739,152, Nov. 5, 1976, Pat. No. 4,118,434. This application Dec. 28, 1977, Ser. No. 865,159

Int. Cl.[2] B01J *29/06*

U.S. Cl. 252—455 Z 11 Claims

1. A composition consisting essentially of:

a calcined, acidic nickel and rare earth-treated crystalline zeolite support impregnated with at least one ruthenium compound subsequent to calcination wherein the ruthenium content is within the range of about 0.01 to about 1 percent by weight of the composition.

4,177,167

CATALYST FOR THE PREPARATION OF DIMETHYL ETHER

Giovanni Manara; Bruno Notari, and Vittorio Fattore, all of San Donato Milanese, Italy, assignors to Snamprogetti S.p.A., Milan, Italy

Filed Dec. 20, 1977, Ser. No. 862,575

Claims priority, application Italy, Dec. 23, 1976, 30800A/76

Int. Cl.[2] B01J *21/12*

U.S. Cl. 252—455 R 6 Claims

1. A catalyst for the production of dimethyl ether consisting essentially of a mixture of an oxide of aluminum with at least one other oxide selected from the group consisting of the oxides of chromium, lanthanum, manganese, copper and zinc, wherein the atomic content of said aluminum is in the range of 10% to 70% and at least said aluminum oxide is stabilized by means of a silicon compound containing hydrolyzable groups selected from the group represented by the formula:

wherein X, Y, Z and W represent —R, —OR, —Cl, —Br, $—SiH_3$, —COOR, $—SiH_nCl_m$, in which R is a member of the group consisting of hydrogen, alkyl, cycloalkyl, aromatic, alkylaromatic, and cycloalkyl having from 1 to 30 C atoms, and n and m represent numbers from 1 to 3, through a thermal treatment wherein said aluminum oxide is impregnated with the silicon compound and then heated in an inert atmosphere to the boiling temperature of the silicon compound so as to react the silicon compound with the aluminum oxide and distill off reaction products and excess silicon compound and thereafter heated in the present of steam so as to react hydrolyzable groups bound to silicon with water.

4,177,168

CATALYST BED FOR USE IN A CATALYTIC FLAMELESS HEATER DEVICE

Patrick J. Denny, Stockton-on-Tees; David L. Harrison, and Martyn H. Stacey, both of Runcorn, all of England, assignors to Imperial Chemical Industries Limited, London, England

Filed Oct. 31, 1974, Ser. No. 519,656

Claims priority, application United Kingdom, Nov. 7, 1973, 51593/73

Int. Cl.[2] B01J *23/64, 23/72, 23/74*

U.S. Cl. 252—470 1 Claim

1. A catalyst bed for use in a catalytic flameless heater device for the oxidation of a vaporous fuel consisting essentially of synthetic inorganic polycrystalline metal oxide fibers and a combustion catalyst supported by the fibers, said catalyst comprising a metal selected from the group consisting of platinum, palladium and rhodium and present at a concentration of 0.01% to 0.5% by weight of the fibers, said catalyst is combined with a metal oxide selected from the group consisting of the oxides of chromium, cobalt, copper, manganese and iron, said fibers having a BET surface area of 5 to 200 square meters per gram and a bulk density in the bed of 0.01 to 0.2 grams per cubic centimeter.

4,177,169

PROCESS FOR IMPROVING THE ACTIVITY OF USED SUPPORTED SILVER CATALYSTS

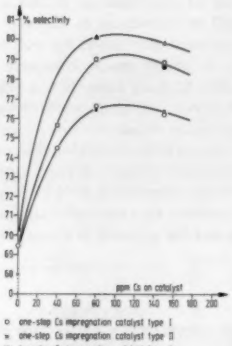
Siegfried Rebsdat, Burg; Sigmund Mayer, Burgkirchen; Josef Alfranseder, Markti, and Josef Riedl, Burgkirchen, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Oct. 26, 1977, Ser. No. 845,563

Claims priority, application Fed. Rep. of Germany, Oct. 29, 1976, 2649359

Int. Cl.[2] B01J *23/50, 23/96;* C07D *301/10, 303/04*

U.S. Cl. 252—476 2 Claims


% selectivity
ppm Cs on catalyst
one-step Cs impregnation catalyst type I
one-step Cs impregnation catalyst type II
two-step Cs impregnation catalyst type I
two-step Cs impregnation catalyst type II
three-step Cs impregnation catalyst type I
three-step Cs impregnation catalyst type II

1. In a process for improving the selectivity of a supported silver catalyst for the direct oxidation of ethylene to ethylene oxide with molecular oxygen or air, of the type wherein on the used catalyst is applied caesuim, rubidium or mixture thereof by impregnating the used catalyst with an impregnating solution containing a compound of caesium, rubidium or mixture thereof, the improvement which comprises making said application at two different times interrupted by a period of using the catalyst, as follows:

(a) making a first application on the catalyst of 10 to 300 ppm caesium, rubidium or mixture thereof;

(b) thereafter using the catalyst for the production of ethylene oxide by direct oxidation of ethylene with molecular oxygen or air;

(c) then interrupting said production after about 2 to 60 weeks, at the end of which time the selectivity of the catalyst is still at about the level which was achieved by said first application;

(d) and next making a second application on the catalyst of 5 to 100 ppm caesium, rubidium or mixture thereof followed by using the resulting catalyst again for said production.

4,177,170

3,3,7,8-TETRAMETHYL-2-OXABICYCLO-[4,4,0]-DECANE DERIVATIVES AND THEIR USE IN PERFUME COMPOSITIONS

Richard C. Cookson, Salisbury, England, and Lorenzo D. Ferro, New York, N.Y., assignors to Bush Boake Allen Limited, London, England

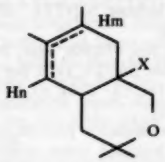
Filed Jun. 19, 1978, Ser. No. 916,494

Claims priority, application United Kingdom, Jun. 21, 1977, 25863/77

Int. Cl.[2] C11B *9/00*

U.S. Cl. 252—522 10 Claims

1. A compound having the formula:



wherein X represents a hydrogen atom or an alkyl group having from 1 to 4 carbon atoms, m has a value of 0 or 1, n has a value of 1 or 2 n+m=2 and the dashed line indicates alternative positions for a unit of unsaturation.

4,177,171

SHAMPOO

John M. Waits, Clark, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

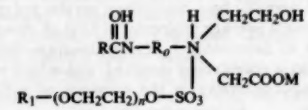
Filed Nov. 3, 1975, Ser. No. 628,309

Int. Cl.[2] C11D *1/88, 1/94*

U.S. Cl. 252—541 3 Claims

1. A low irritation shampoo composition having a viscosity greater than 4,000 centipoise as measured at 23°-25° C. comprising;

(a) 5-20% by weight, based on the total weight of the composition, of an amphoteric anionic surfactant of the formula



where R is a 9-17 carbon alkyl radical, R_o is an alkylene group of 2-4 carbon atoms, R_1 is a member of the group consisting of $C_{13}H_{27}$ and $C_{12}H_{25}$, n is 2-6, and M is a member of the group consisting of alkali metals, triethanolamine mixtures of an alkali metal with hydrogen and mixtures of triethanolamine with hydrogen, and

(b) 8 to 20% by weight of a 16-18 carbon atom fatty acid monoester of sorbitan reacted with 60 to 100 moles of ethylene oxide.

4,177,172

AQUEOUS NITROCELLULOSE/ALKYD RESIN DISPERSION

Hans-Joachim Traenckner, Krefeld; John Goossens, Cologne; Wolfgang Kremer, Kerken, and Heinz Krönke, Bomlitz, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 871,610, Jan. 23, 1978, abandoned, and a continuation-in-part of Ser. No. 871,611, Jan. 23, 1978, abandoned. This application Dec. 14, 1978, Ser. No. 969,557

Claims priority, application Fed. Rep. of Germany, Jan. 26, 1977, 2702986; Jan. 26, 1977, 2703075

Int. Cl.[2] C08L *1/18*

U.S. Cl. 260—15 5 Claims

1. An aqueous dispersion of a binder for coating compositions said dispersion comprising

(a) 5-50% by weight of nitrocellulose,

(b) 5-30% by weight, based on (a), of plasticizer for (a),

(c) 5-50% by weight of alkyd resin having an oil content of 5-50% by weight, based on alkyd resin,

(d) 30-80% by weight of water, and

(e) 0.5-10% by weight of emulsifier, the percentages of a, c, d and e being based on the sum of components (a) to (e), in which the emulsifier is a member of the group consisting of

(i) a partially saponified polyvinyl acetate having a degree of hydrolysis of 70-97%,

(ii) a polyvinyl pyrrolidone, and

(iii) a hydrolyzed vinyl acetate/vinyl pyrrolidone copolymer, the particle size of the dispersed phase being from 0.1 to 1.5μ.

4,177,173

POLYEPOXIDE CURING BY POLYMERCAPTANS CATALYZED BY DIMETHYLAMINO ALKYL ETHERS

Brian J. Carr, Fairfax, Calif., assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Dec. 20, 1978, Ser. No. 971,434

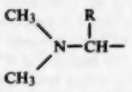
Int. Cl.[2] C08G *59/66, 59/68*

U.S. Cl. 260—18 EP 36 Claims

1. A curing system for curing polyepoxides comprising:

(a) at least one polymercaptan, and

(b) at least one catalyst which is poly[(N,N-dimethylamino) alkyl] ether containing two, three or four N,N-dimethylaminoalkyl substituents of the formula



where R represents hydrogen or straight or branched chain alkyl radicals having from 1 to 10 carbon atoms and in any one compound R can be the same or different and with the proviso that the dimethylamino groups are one, two or three carbon atoms removed from ether oxygen.

4,177,174

EPOXY RESIN COMPOSITION CURED BY REACTION PRODUCT OF PHENOL CARBOXYLIC ACIDS WITH POLYAMINO COMPOUNDS

Masaaki Hayashi, Kamakura; Kazuyoshi Tsuneta; Hiroshi Takada, both of Yokohama; Nobuhiro Kenmotsu, and Hiroharu Sasaki, both of Kamakura, all of Japan, assignors to Dai Nippon Toryo Co., Ltd., Osaka, Japan

Filed May 9, 1977, Ser. No. 795,125

Claims priority, application Japan, May 14, 1976, 51-55025; May 20, 1976, 51-57275

Int. Cl.[2] C08G *59/44*

U.S. Cl. 260—18 PN 11 Claims

1. An epoxy resin coating compositions comprising (1) an

epoxy resin containing in the molecule at least 2 epoxy groups and (2) a curing agent composition formed by condensing an amino compound containing in the molecule at least two nitrogen atoms and active hydrogen atoms bonded thereto with 5 to 30% by weight, based on the amino compound, of at least one member selected from the group consisting of protocatechuic acid and gallic acid and esters thereof, said esters being formed with alcohols containing 1–12 carbon atoms, said amino compound being at least one member selected from the group consisting of amine adduct resins and polyamide resins.

4,177,175

ORGANOTHIOL-CONTAINING SILOXANE RESINS AS ADHESION PROMOTERS FOR SILOXANE RESINS

Ronald H. Baney, Midland, and Len A. Harris, Rhodes, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Continuation-in-part of Ser. No. 863,968, Dec. 23, 1977, abandoned. This application Jun. 7, 1978, Ser. No. 913,423

Int. Cl.[2] **C08J** *3/02;* **C08L** *83/04*

U.S. Cl. 260—29.2 M **13 Claims**

1. A composition of matter which is a pigment-free aqueous coating composition comprising a mixture of (A) a dispersion of colloidal silica in lower aliphatic alcohol-water solution of the partial condensate consisting essentially of of a silanol of the formula $RSi(OH)_3$ or a dispersion of colloidal silica in ether esters of ethylene or propylene glycol-water solution, of the partial condensate consisting essentially of of a silanol of the formula $RSi(OH)_3$ in which R is selected from the group consisting of alkyl radicals of 1 to 3 inclusive carbon atoms, the vinyl radical, the 3,3,3-trifluoropropyl radical, the gamma-glycidoxypropyl radical, the gamma-methacryloxypropyl radical and the phenyl radical, at least 70 weight percent of the silanol being $CH_3Si(OH)_3$, said composition containing 10 to 50 weight percent solids consisting essentially of 10 to 70 weight percent colloidal silica and 30 to 90 weight percent of the partial condensate, said composition containing sufficient acid to provide a pH in the range of 2.5 to 6.0, having added thereto sufficient (B) to give 1–5 weight percent of the solids of (B) based on the weight of the total solids of (A) and (B) in the composition wherein (B) is an aqueous composition comprising a dispersion of colloidal silica in lower aliphatic alcohol-water solution of a partial condensate of a silanol of the formula $R'Si(OH)_3$ or a dispersion of colloidal silica in ether esters of ethylene or propylene glycol-water solution of a partial condensate of a silanol of the formula $R'Si(OH)_3$ in which R′ is selected from HSR″— and $(HS)_2R''$— wherein R″ is selected from a group consisting of a divalent or trivalent aliphatic hydrocarbon radical having 1–6 carbon atoms and phenylene, the colloidal silica in (B) being present in the amount of 34 to 50 weight percent and the amount of $R'Si(OH)_3$ present in (B) being 50 to 66 weight percent both being based on the total weight of solids contained in (B), said composition (B) containing 10 to 50 weight percent solids, said composition (B) containing sufficient acid to provide a pH in the range of 2.8 to 5.2 until it is added to composition (A).

4,177,176

TREATMENT OF FIBRES

Peter M. Burrill, and Frank S. Rankin, both of S. Glamorgan, Wales, assignors to Dow Corning Limited, Barry, Wales

Filed May 7, 1976, Ser. No. 684,201

Claims priority, application United Kingdom, May 17, 1975, 21101/75

Int. Cl.[2] **C08L** *83/08*

U.S. Cl. 260—29.2 M **8 Claims**

1. A composition consisting of (A) a polydiorganosiloxane having a molecular weight of at least 2500 and terminal —OX radicals wherein X represents a hydrogen atom or an alkyl or alkoxyalkyl radical having up to 15 carbon atoms, at least two of the silicon-bonded substituents present in said polydiorganosiloxane being monovalent radicals composed of carbon, hydrogen, nitrogen and, optionally, oxygen, which radicals contain at least two amine groups and are attached to silicon through a silicon to carbon linkage, and at least 50 percent of the total substituents in said polydiorganosiloxane being methyl, radicals, any remaining substituents being monovalent hydrocarbon radicals having from 2 to 20 inclusive carbon atoms, and (B) an organosiloxane having at least three silicon-bonded hydrogen atoms in the molecule and in which the organic radicals are alkyl radicals having less than 19 carbon atoms.

4,177,177

POLYMER EMULSIFICATION PROCESS

John W. Vanderhoff, 345 9th Ave., Bethlehem, Pa. 18018; Mohamed S. El-Aasser, 1201 N. Maxwell St., Allentown, Pa. 18103, and John Ugelstad, SINTEF, 7034 Trondheim-NTH, Trondheim, Norway

Continuation of Ser. No. 670,908, Mar. 26, 1976, abandoned. This application Jan. 27, 1978, Ser. No. 873,067

Int. Cl.[2] **C08L** *83/04*

U.S. Cl. 260—29.2 M **28 Claims**

1. A polymer emulsification process comprising first intimately dispersing a liquified water insoluble polymer phase having a viscosity of less than about 10,000 cps in an aqueous liquid medium phase in an approximate polymer phase:aqueous phase weight ratio of 0.1:1 to 2:1 at a temperature of about 40° to about 90° C., said aqueous phase containing about 0.1 to about 5%, by weight of the water therein, of at least one nonionic, anionic or cationic oil-in-water functioning emulsifying agent, in the presence of about 0.2 to about 12%, by weight of said polymer phase, of a compound selected from the group consisting of those hydrocarbons and hydrocarbyl alcohols, ethers, amines, halides and esters which are inert, nonvolatile, water insoluble, liquid at said temperature and contain a terminal aliphatic hydrocarbyl group of at least about 8 carbon atoms, and mixtures thereof, and then subjecting the resulting crude emulsion to the action of comminuting forces sufficient to enable the production of a stable, sedimentation-resistant aqueous emulsion containing polymer particles averaging less than about 0.5μ in size.

4,177,178

THERMOSETTING ACRYLIC COPOLYMER COMPOSITIONS

Suryya K. Das, Pittsburgh, and Charles M. Kania, Tarentum, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Apr. 17, 1978, Ser. No. 897,087

Int. Cl.[2] **C08G** *33/00;* **C08L** *33/02, 61/32;* **C08K** *3/10*

U.S. Cl. 260—29.40 A **6 Claims**

1. In an aqueous thermosetting resinous coating composition of a dispersed acrylic copolymer containing active hydrogens selected from the class consisting of hydroxyl, primary amine, secondary amine, amido, thiol and carboxylic acid, and a curing agent stable in the presence of said acrylic polymer at room temperature but reactive with the active hydrogens of the acrylic polymer at an elevated temperature to form a cured product, the improvement comprising:

an at least partially base neutralized acrylic polymer which has a weight average molecular weight of about 15,000 to 100,000, as determined by gel permeation chromatography using a polystyrene standard, and which is prepared from copolymerizing in the presence of a free radical initiator:

(A) 20 to 40 percent by weight of a vinyl aromatic compound,

(B) 10 to 35 percent by weight of an alkyl ester of methacrylic acid having 1 to 3 carbon atoms in the alkyl group,

(C) 15 to 40 percent by weight of an alkyl ester of acrylic acid having 2 to 12 carbon atoms in the alkyl group or an alkyl ester of methacrylic acid having 4 to 12 carbon atoms in the alkyl group,

(D) 2 to 20 percent by weight of an acrylic monomer

containing active hydrogens selected from the class consisting of hydroxyl, primary amine, secondary amine, amido and thiol,

(E) 2 to 15 percent by weight of an alpha, beta-ethylenically unsaturated carboxylic acid,

(F) 2 to 20 percent by weight of an alkyl ester of an alpha, beta-ethylenically unsaturated carboxylic acid having 14 to 20 carbon atoms in the alkyl group,

the percentage by weight of the acrylic monomers presented above being based on total weight of acrylic monomers; said coating composition containing from 20 to 60 percent by weight resin solids.

4,177,179

AQUEOUS COLD SETTING PAINT

Kenji Kurihara, Atsugi; Shigekazu Kasahara, Sagamihara, and Takashi Suzuki, Chofu, all of Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Yamaguchi, Japan

Filed Aug. 3, 1978, Ser. No. 930,697

Claims priority, application Japan, Aug. 26, 1977, 52/101732

Int. Cl.[2] C08L *39/00*

U.S. Cl. 260—29.6 NR **17 Claims**

1. An aqueous cold setting paint which comprises

(A) a copolymer obtained by a solution polymerization of

(a) a monomer having ethylenic unsaturated double bond and a nitrogen-containing base,

(b) a monomer having ethylenic unsaturated double bond and a phosphoric acid group or a salt thereof or an ester thereof,

(c) a monomer having ethylenic unsaturated double bond and carboxylic acid group or a salt thereof, and

(d) a monomer having ethylenic unsaturated double bond which is copolymerizable with the component (a), (b) or (c); or

(B) a copolymer obtained by treating the copolymer (A) with a base and

(C) an epoxy resin being soluble in an alcoholic solvent.

4,177,180

COMPOSITION COMPRISING RESIN AND PIGMENT FOR AUTODEPOSITION

Wilbur S. Hall, Plymouth Meeting, Pa., assignor to Amchem Products, Inc., Ambler, Pa.

Continuation-in-part of Ser. No. 613,717, Sep. 15, 1975, abandoned. This application Aug. 30, 1976, Ser. No. 718,605

Int. Cl.[2] C08L *9/08, 9/10*

U.S. Cl. 260—29.7 H **22 Claims**

1. An aqueous composition consisting essentially of a mixture of latex which includes resin particles and an aqueous dispersion of pigment particles, the resin and pigment particles having an affinity for each other, and in which substantially all of the resin particles are associated with pigment particles in a manner such that the particles resist being dissociated even when subjected to vigorous mixing.

4,177,181

FLAME-RETARDANT ADHESIVE COMPOSITIONS

Michio Tsurumi; Takashi Sakakiyama; Kichiya Tazaki, and Masaoki Koyama, all of Yokohama, Japan, assignors to Asahi-Dow Limited, Tokyo, Japan

Filed Mar. 15, 1978, Ser. No. 886,852

Claims priority, application Japan, Mar. 18, 1977, 52-29306

Int. Cl.[2] C08F *236/18*

U.S. Cl. 260—29.7 H **10 Claims**

1. A copolymer latex which is obtained from emulsion copolymerization, in aqueous medium, of monomers consisting essentially of from about 5 to about 60 weight percent of an aliphatic conjugated diolefin, from about 5 to about 55 weight percent of a monoolefinic monomer selected from the group consisting of aromatic vinyl monomers, acrylate esters and methacrylate esters, from about 0.5 to about 10 weight percent of an ethylenically unsaturated carboxylic acid, and from about 25 to about 70 weight percent of vinylidene chloride, said copolymerization being arranged such that a first monomer mixture containing substantially all of the vinylidene chloride monomer and also containing acrylate or methacrylate ester monomer is first subjected to emulsion copolymerization and, then, a second monomer mixture containing substantially all of the aliphatic conjugated diolefin and substantially all of any aromatic vinyl monomer employed is subjected to emulsion copolymerization in the presence of the first copolymerization product.

4,177,182

POLYVINYL CHLORIDE SERIES RESIN MEDICAL PRODUCT IMPLEMENTS AND METHOD OF MANUFACTURING THE SAME USING SILOXANE OIL ADDITIVE

Toshiji Ichikawa, Tokyo, Japan, and Osamu Minoo, Bratislava, Czechoslovakia, assignors to Terumo Corp., Tokyo, Japan

Filed Sep. 23, 1975, Ser. No. 615,978

Claims priority, application Japan, Oct. 28, 1974, 49-123469

Int. Cl.[2] C08J *3/00*

U.S. Cl. 260—29.1 SB **5 Claims**

1. The method of reducing the leaching of plasticizer from medical product implements made of resin composition consisting essentially of polyvinyl chloride series resin plasticized with 20 to 80% by weight of plasticizer based on the weight of polyvinyl chloride series resin which comprises incorporating in such resin composition 0.2 to 7% by weight of silicone oil based on the weight of polyvinyl chloride series resin, said silicone oil being at least one siloxane compound selected from the group consisting of polymethyl phenyl siloxane, polydimethyl siloxane, polydiphenyl siloxane, polydimethyl phenyl siloxane and polydimethyl hydrogen siloxane.

4,177,183

PROCESS FOR THE PREPARATION OF COATINGS COMPOSED OF POLYHYDROXY COMPOUNDS

Horst Dalibor, Norderstedt, Fed. Rep. of Germany, assignor to Hoechst Aktiengeselischaft, Fed. Rep. of Germany

Filed Apr. 21, 1977, Ser. No. 789,660

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1976, 2618810

Int. Cl.[2] C09D *3/74, 3/52*

U.S. Cl. 260—31.4 R **7 Claims**

1. A coating binder composition, dissolved in solvents which do not contain active hydrogen atoms, composed of a binder (A) comprising a mixture of a copolymer which contains hydroxyl groups and which is a reaction product from mixtures of polymerizable vinyl compounds which contain α,β-ethylenically unsaturated monocarboxylic acids and styrene and glycidyl esters and (B), polyisocyanate wherein component A consists of 60–80 percent by weight of hydroxyl group containing copolymers, having a total hydroxyl group content of 3.5 to 6.5 percent by weight, prepared in the presence of a mixture of a diacyl peroxide or perester and an alkyl hydroperoxide or dialkyl peroxide as polymerization initiators, from:

(a) 5–24 percent by weight of glycidyl ester of alkanemonocarboxylic acids selected from the group consisting of α-alkyl-alkanemonocarboxylic acids and α,α-dialkylalkanemonocarboxylic acids of the following empirical formula $C_{12\text{-}14}H_{20\text{-}26}O_3$, and slow, uniform addition to said glycidyl esters (a) of

(b) 12–30 percent by weight of compounds selected from the group consisting of hydroxyethyl acrylate and hydroxyethyl methacrylate,

(c) 1–10 percent by weight of acrylic acid,

(d_1) 20–50 percent by weight of styrene, and

(d_2) 5–35 percent by weight of methyl methacrylate,

the components a, b, c, d_1, and d_2, based on 100 percent by weight of components a to d_2, and the polymerization and condensation reactions taking place simultaneously and jointly, with the additional condition that components a, b, and c are employed in such quantities that the copolymer component A

has a hydroxyl group content of 3.5 to 6.5 percent by weight, and component B consists of 20 to 40 precent by weight of an organic polyisocyanate, it being necessary that components A and B together give a numerical value of 100 percent by weight.

4,177,184

POLYMERIC BLEND FOR AUTOMOTIVE APPLICATIONS

Nancy J. Condon, Missouri City, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Jun. 26, 1978, Ser. No. 918,755

Int. Cl.[2] C08K *5/20*

U.S. Cl. 260—32.6 A **10 Claims**

1. A composition comprising the admixture obtained by mixing:

(a) 100 parts by weight of a selectively hydrogenated monoalkenyl arene-conjugated diene multiblock copolymer;

(b) 5 to 200 parts by weight of a polymeric alpha-olefin;

(c) 5 to 200 parts by weight of a filler;

(d) 5 to 200 parts by weight of a synthetic rubberizing polymer; and

(e) 0.05 to about 15.0 parts by weight of a fatty acid amide wherein said rubberizing polymer is selected from the group consisting of non-hydrogenated monoalkenyl arene-conjugated diene multi-block copolymers; selectively hydrogenated monoalkenyl arene-conjugated diene A'-B' two block copolymers; ethylene-propylene copolymers; EPDM-type terpolymers; polyisobutylene; butyl rubber; polybutadiene and neoprene.

4,177,185

FLAMEPROOF POLYAMIDE MOULDING COMPOSITION

Peter Tacke; Dieter Neuray, and Dietrich Michael, all of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Fed. Rep. of Germany

Filed Jan. 3, 1979, Ser. No. 752

Claims priority, application Fed. Rep. of Germany, Jan. 5, 1978, 2800467

Int. Cl.[2] C08K *3/32, 5/51*

U.S. Cl. 260—38 **6 Claims**

1. A self-extinguishing thermoplastic moulding composition which comprises:

(1) from 40 to 95%, by weight, of a polyamide,

(2) from 0.5 to 20%, by weight, of a phenol/aldehyde resin;

(3) from 0.2 to 12%, by weight, of a polymeric phosphoryl nitride oxide and/or a precursor thereof consisting of:

(a) from 20 to 50.8%, by weight, of P,

(b) from 15 to 23%, by weight, of N,

(c) from 45 to 26.2%, by weight, of O,

(d) from 12 to 0%, by weight, of C and

(e) from 8 to 0%, by weight, of H;

and, optionally,

(4) from 0 to 50%, by weight, of one or more reinforcing materials and/or fillers.

4,177,186

STABILIZATION OF LIGHT-SENSITIVE POLYMERS

Jean Rody, Basel, Switzerland; Gerd Greber, Bad Vöslau, Austria, and Helmut Müller, Binningen, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

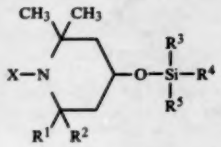
Continuation-in-part of Ser. No. 687,825, May 19, 1976, abandoned. This application Nov. 21, 1977, Ser. No. 853,655

Claims priority, application Switzerland, May 28, 1975, 6831/75

Int. Cl.[2] C07D *211/18;* C08K *5/34*

U.S. Cl. 260—45.8 N **13 Claims**

1. A compound of formula I



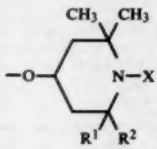
(I)

wherein

R^1 and R^2 independently from one another represent alkyl having 1–4 C-atoms or together with the C-atom to which they are attached form a cyclopentane or cyclohexane or a 2,2,6,6-tetramethylpiperidine ring,

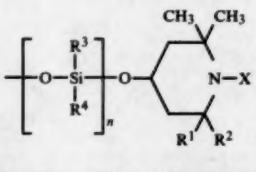
R^3 is hydrogen, methyl, phenyl or vinyl,

R^4 and R^5 independently from one another represent hydrogen, methyl, phenyl, vinyl, alkoxy having 1–8 C-atoms, alkoxyalkoxy having 3–10 C-atom, cyclohexyloxy, aralkoxy having 7 or 8 C-atoms, phenoxy which is unsubstituted or substituted by chlorine, alkyl or alkoxy having each 1–4 C-atoms, or a group of the formula Ia



(Ia)

and, if R^3 and R^4 are hydrogen, methyl, phenyl or vinyl, R^5 may also be a group of the formula Ib



(Ib)

wherein n is an integer of from 1 to 20, and

X is hydrogen, alkyl having 1–12 C-atoms, alkenyl having 3–6 C-atoms, alkoxyalkyl having 3–14 C-atoms, aralkyl having 7 or 8 C-atoms or an aliphatic acyl group having 1–4 C-atoms or one of the groups $—CH_2COOR^6$, $—CH_2—CH(R^7)—OR^8$ or $—COOR^9$ wherein

R^6 is alkyl having 1–8 C-atoms, alkenyl having 3–6 C-atoms, phenyl, aralkyl having 7 or 8 C-atoms or cyclohexyl,

R^7 is hydrogen, methyl or phenyl,

R^8 is hydrogen or an aliphatic, aromatic, araliphatic or alicyclic acyl group having up to 18 C-atoms, which may be substituted in its aryl moiety with chlorine, alkyl having 1–4 C-atoms, alkoxy having 1–8 atoms and/or hydroxy, and

R^9 is alkyl having 1–8 C-atoms, benzyl, phenyl or cyclohexyl, with the proviso that, when X is hydrogen and

R^3 is phenyl, one of R^4 and R^5 is different from a 2,2,6,6-tetramethylpiperidine-4-oxy residue.

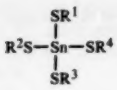
11. A composition of matter stabilized against photodeterioration comprising an organic polymer, normally subject to deterioration by light, and from 0.01 to 5.0 percent by weight of a compound as claimed in claim 1.

4,177,187
STABILIZERS FOR HALOGENATED RESINS

Joseph M. Bohen, King of Prussia, Pa., assignor to Pennwalt Corporation, Philadelphia, Pa.

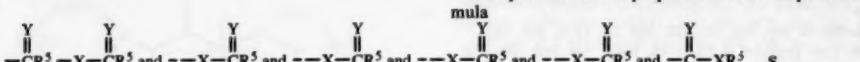
Filed Aug. 29, 1977, Ser. No. 828,703
Int. Cl.[2] C08K 5/58
U.S. Cl. 260—45.75 S 11 Claims

1. A composition comprising a mixture of (a) from about 20 to 80 weight percent of a tin tetrakis (mercaptide) having the formula:

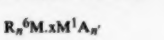


where

R^1, R^2, R^3 and R^4 are hydrocarbon radicals having from 1 to 22 carbon atoms and are independently selected from the group consisting of alkyl, cycloalkyl, aryl, mixed alkyl-aryl and said hydrocarbon radicals having a substituent selected from the group consisting of halogen, —XH, —XR^5,



where R^5 is a hydrocarbon radical having from 1 to 20 carbon atoms and is selected from the group consisting of alkyl, alkenyl, cycloalkyl, aryl and mixed alkyl-aryl, and X and Y are independently either oxygen or sulfur; and (b) from about 80 to 20 weight percent of an overbased organic complex of an alkali or alkaline earth metal base having the formula



where

R^6 is a residue of an organic acid selected from the group consisting of carboxylic, thiocarboxylic, sulfonic, sulfinic, phosphonic, phosphinic, thiophosphonic, thiophosphinic, phenolic, and thiophenolic;

n and n′ are independently 1 or 2;

M and M^1 are independently selected from the group consisting of alkali and alkaline earth metals; x is a positive integer greater than zero; and

A is an anion of the base material selected from the group consisting of OH^{-1}, CO_3^{-2}, O^{-2}, SO_4^{-2}, SO_3^{-2}, HCO_3^{-1} and S^{-2}.

8. The composition of claim 1 dispersed in poly(vinyl chloride)resin.

4,177,188
PROCESS FOR RECOVERING PURIFIED ALBUMIN FROM BLOOD PLASMA USING PEG AND CAPRYLIC ACID

Jørgen F. Hansen, Rødovre, Denmark, assignor to Nordisk Insulinlaboratorium, Gentofte, Denmark

Filed Jan. 10, 1978, Ser. No. 868,253
Claims priority, application Denmark, Jan. 21, 1977, 258/77
Int. Cl.[2] C07G 7/00
U.S. Cl. 260—122 3 Claims

1. A process for recovering purified albumin suitable for intravenous injection from human blood plasma without denaturing the globulins present therein, comprising the steps of:

(a) mixing the blood plasma with 150 to 300 g polyethylene glycol (PEG) per liter of liquid mixture and adjusting the mixture to a pH of 6 to 7 for precipitating fibrinogen and globulins while forming a supernatant containing albumin;

(b) separating the supernatant from the formed precipitate;

(c) adjusting the pH of the supernatant to a pH of 4.5 to 5.3; for precipitating albumin;

(d) redissolving the albumin with entrained PEG in an aqueous medium;

(e) subjecting the resulting albumin solution formed during step (d) to thermocoagulation at 50 to 65° C. and a pH of 4.6 to 5.0 in the presence of a stabilzing amount of caprylic acid; and

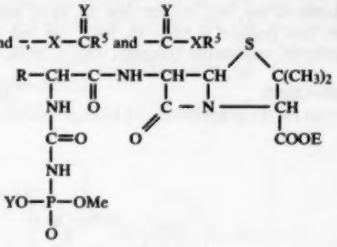
(f) isolating the purified albumin from the solution by precipitation.

4,177,189
PROCESS FOR THE PREPARATION OF HYDROXYPHOSPHINYLUREIDOBENZYLPENICILLINS

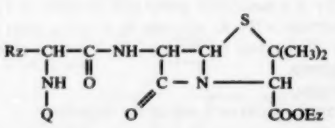
Piet J. Akkerboom, Zoetermeer; Geertruida J. Lower, Geleen, and Willem J. Timp, Delft, all of Netherlands, assignors to Gist-Brocades N.V., Delft, Netherlands

Filed May 22, 1978, Ser. No. 908,221
Claims priority, application United Kingdom, Jun. 1, 1977, 23227/77
Int. Cl.[2] C07D 499/68
U.S. Cl. 260—239.1 14 Claims

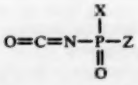
1. A process for the preparation of a compound of the formula



wherein R is phenyl optionally substituted with one to two members which may be the same or different selected from the group consisting of hydroxy, lower alkyl and lower alkoxy, Y is selected from the group consisting of Me, lower alkyl, aryl(-lower)alkyl and aryl in which the aryl is optionally substituted by at least one alkyl, Me is a metal cation and E is selected from the group consisting of hydrogen and a metal cation which may be the same or different from the metal cation Me, comprising reacting a compound of the formula



wherein Q is selected from the group consisting of hydrogen atom and silicon atom carrying substituents selected from the group consisting of lower alkyl, lower haloalkyl, aryl, aralkyl and lower alkoxyalkyl and halogen, Rz has the same significance as R as defined above with the proviso that any hydroxy group(s) present on the phenyl group are replaced by —OQz wherein Qz is a silicon atom carrying substituents selected from the group consisting of lower alkyl, lower haloalkyl, aryl, aralkyl and lower alkoxyalkyl and halogen and Ez is a carboxyl protecting group with a compound of the formula



wherein Z is halogen, and X is selected from the group consist-

ing of OY and Z at a temperature below 0° C. under anhydrous conditions in an organic solvent medium, carefully hydrolyzing the resulting product thus either with an amount of water just sufficient to remove any protecting groups present in the intermediate product and to hydrolyze Z to hydroxy and, still under anhydrous or substantially anhydrous conditions, converting hydroxy formed by hydrolysis of Z into OMe, wherein Me is as defined above by reaction with an organic acid salt having a salt-forming cation Me or in the case wherein the organic solvent used in insoluble or substantially insoluble in water, with an excess of water, washing the mixture with water at a pH-value of 0 to 3 extracting the organic layer formed with water at a pH-value of 5 to 8 by adding a hydroxide or a salt having a salt-forming cation Me to convert hydroxy formed by hydrolysis of Z into OMe and Ez into Me wherein Me is as defined above.

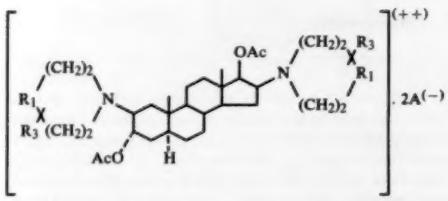
4,177,190

DIAMINO-ANDROSTANES AND A PROCESS FOR THE PREPARATION OF THE SAID COMPOUNDS

Zoltán Tuba; Maria Marsai; Katalin Biro; László Szporny; Egon Karpati, and Szabolcs Szeberényi, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar Rt., Budapest, Hungary

Continuation of Ser. No. 709,325, Jul. 28, 1976, Pat. No. 4,101,545. This application Mar. 14, 1978, Ser. No. 886,450
Claims priority, application Hungary, Aug. 1, 1975, RI 575
Int. Cl.[2] C07J *43/00*
U.S. Cl. 260—239.5 **10 Claims**

1. A process for the preparation of a di-quaternary salt of the formula



(Ia)

wherein

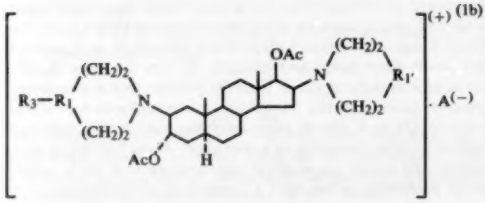
Ac is an alkyl carbonyl group having 1 to 4 carbon atoms in the alkyl moiety, one of

R_1 and R_1' is a methylene group and the other is a group of the formula $>N—R_2$ wherein R_2 is a C_{1-3} alkyl group,

R_3 is an alkyl group containing 1 to 4 carbon atoms or an allyl group,

A is halogen,

or of a mono-quaternary salt of the formula



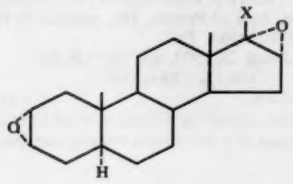
(Ib)

wherein

Ac, A and R_3 have the same meaning as defined above,

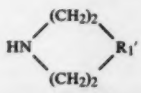
R_1' is a methylene group and

R_1 is a group of the formula $>R—R_2$ wherein R_2 is as defined above, which comprises selectively reacting the 16,17 epoxy group of a compound of the formula



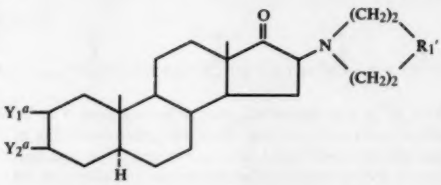
(V)

wherein X is halogen—with a compound of the formula



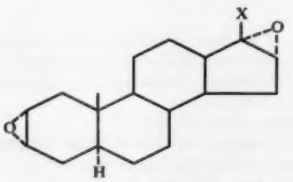
(VI')

in the presence of a hydrogen halide wherein R_1' is a methylene group or a $>N—R_2$ group to form a compound of the formula



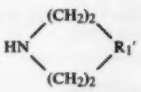
(IVa)

wherein Y_1^a is halogen and Y_2^a is hydroxy; or selectively reacting the 16,17-epoxy group of a compound of the formula



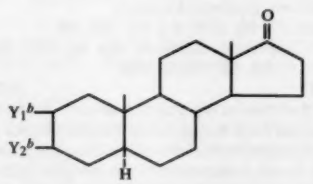
(V)

wherein X is halogen with a compound of the formula



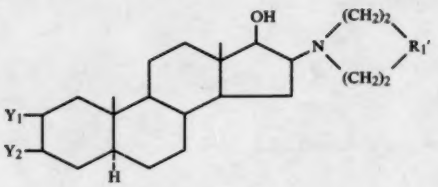
(VI')

wherein R_1' is a methylene group or a $N—R_2$ group, to form a compound of the formula



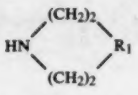
(IVb)

wherein Y_1^b and Y_2^b form together an epoxy group, and reducing the compound IVa or IVb to form a compound of the formula:



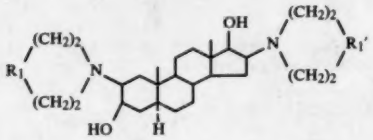
(III)

wherein Y_1 is halogen, Y_2 is hydroxyl or Y_1 and Y_2 form together an epoxy group;
reacting the compound formed above with a compound of the formula:



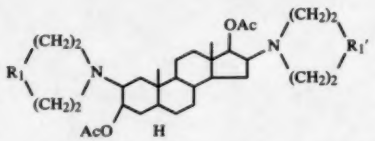
(VI)

to yield a compound of the formula



(II)

acylating the compound formed above with a C_1 to C_5 aliphatic carboxylic acid, C_1 to C_5 aliphatic carboxylic acid anhydride or C_1 to C_5 aliphatic carboxylic acid halogenide to yield a compound of the formula



(I)

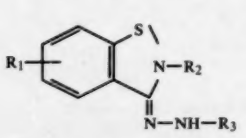
and converting the compound above into a quaternary salt thereof of the formula 1a or 1b.

4,177,191
2-ALKYL-3-(SUBSTITUTED HYDRAZINO)BENZISOTHIAZOLINES

Peter C. Wade, Pennington, N.J.; B. Richard Vogt, Yardley, Pa., and Thomas P. Kissick, Princeton, N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Jul. 20, 1978, Ser. No. 926,467
Int. Cl.[2] A61K *31/425*; C07D *275/04*
U.S. Cl. 548—212 **15 Claims**

1. A compound having the formula



or a pharmaceutically acceptable salt thereof, wherein R_1 is hydrogen, alkyl, alkoxy, halogen or nitro; R_2 is alkyl; and R_3 is

(i)

wherein X is oxygen, sulfur or imino, or

(ii)

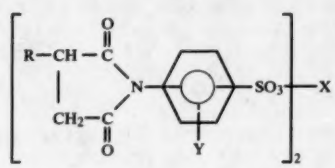
wherein Y is alkoxy, alkyl, or arylalkyl; wherein the terms "alkyl" and "alkoxy" refer to groups having 1 to 6 carbon atoms and the term "aryl" refers to phenyl or phenyl substituted with a halogen, alkyl, alkoxy, hydroxy or nitro group.

4,177,192
SUCCINIMIDES OF AMINO AROMATIC SULFONIC ACID SALTS

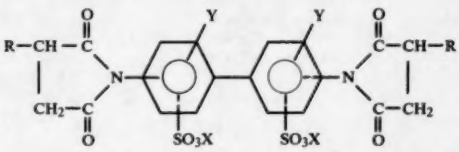
El-Ahmadi I. Heiba, Princeton; Robert E. Kinney, Lawrenceville, and George E. Stead, South Plainfield, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 634,812, Nov. 24, 1975, Pat. No. 4,053,425, which is a division of Ser. No. 391,178, Aug. 24, 1973, abandoned. This application Apr. 22, 1977, Ser. No. 790,096
Int. Cl.[2] C07D *403/12, 207/40*
U.S. Cl. 260—326.22 **7 Claims**

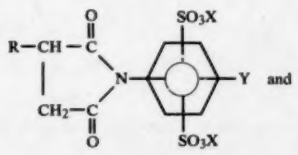
1. A compound of one of the formulae:



(1)

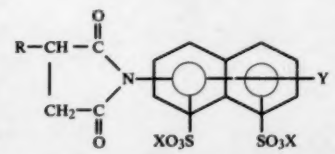


(2)



and

(3)



(4)

wherein X is selected from the group consisting of (1) HNR'_3, wherein R' is hydrogen, an alkyl group, an aminoalkyl group or a poly(aminoalkyl) group, said alkyl having from 1 to 20 carbon atoms, and (2) metal, Y is selected from the group consisting of hydrogen, halo, hydroxy and an alkyl group of from 1 to 20 carbon atoms and R is an alkenyl of from 5 to 1000 carbon atoms.

4,177,193

THIENOTHIAZINE DERIVATIVES

Otto Hromatka; Dieter Binder, both of Vienna, Austria; Rudolf Pfister, Basel, and Paul Zeller, Allschwil, both of Switzerland, assignors to Hoffman-La Roche Inc., Nutley, N.J.

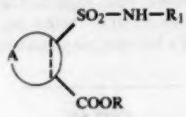
Division of Ser. No. 852,385, Nov. 17, 1978, Pat. No. 4,134,898, which is a division of Ser. No. 606,563, Aug. 21, 1975, Pat. No. 4,076,709. This application Oct. 30, 1978, Ser. No. 955,567

Claims priority, application Switzerland, Aug. 26, 1974, 11582/74; Sep. 9, 1974, 12157/74; Sep. 9, 1975, 8963/75

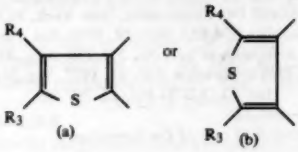
Int. Cl.[2] C07C *333/18, 333/24*

U.S. Cl. 549—64 **1 Claim**

1. A compound of the formula



wherein A together with the two carbon atoms to which it is attached forms the group



and the broken line represents the double bond present in group (a); R_1 and R represent a lower alkyl group; and R_3 and R_4 each represent a hydrogen atom or a lower alkyl group.

4,177,194

TOTAL SYNTHESIS OF THE UTERO-EVACUANT SUBSTANCE D,L-ZOAPATANOL

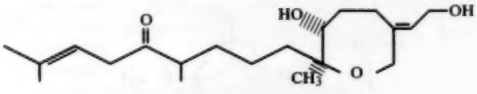
Robert H. K. Chen, Belle Mead, N.J., assignor to Ortho Pharmaceutical Corporation, Raritan, N.J.

Filed Jun. 29, 1978, Ser. No. 920,432

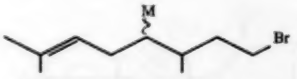
Int. Cl.[2] C07D *313/04*

U.S. Cl. 260—333 **8 Claims**

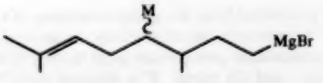
1. The process for the preparation of a compound of the formula



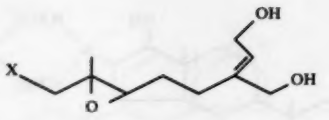
which comprises reacting a compound of the formula



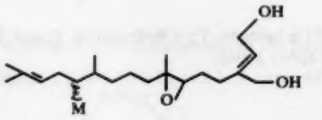
with magnesium to provide a Grignard reagent of the formula



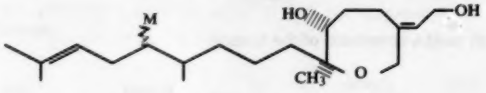
reacting the Grignard reagent with a compound of the formula



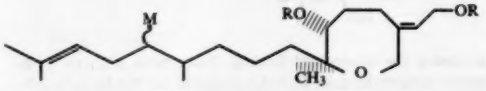
to produce a compound of the formula



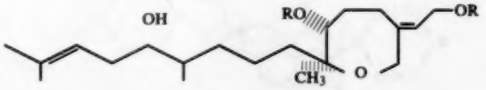
and reacting the product with a Lewis acid or a protic acid to produce a compound of the formula



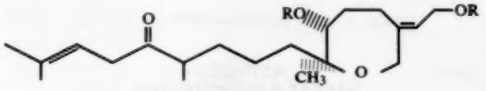
reacting the product with an acylating agent to produce a compound of the formula



reacting the acylated product with an acid to produce a compound of the formula



reacting the product with an oxidizing agent to form a compound of the formula



and hydrolyzing the product with a base, wherein R is an acyl group having 2–5 carbon atoms, M is an tetrahydropyran-2-yloxy or 1-ethoxyethoxy group, and X is bromo, chloro, iodo, tosyl, mesyl and brosyl.

4,177,195

ORGANIC PIGMENTS DERIVED FROM BENZOCOUMARIN

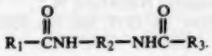
Richard C. Bingham, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 20, 1978, Ser. No. 898,443

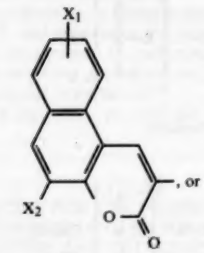
Int. Cl.[2] C07D *311/92, 405/14*

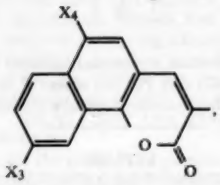
U.S. Cl. 260—343.21 **9 Claims**

1. A compound of the formula

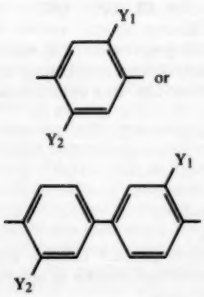


where R_1 and R_3 are





and R_2 is



wherein

X_1 is hydrogen, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, chlorine or bromine;

X_2 is hydrogen or CONHAr, wherein Ar is phenyl and phenyl substituted with alkyl of 1 to 3 carbon atoms, alkoxy of 1 to 4 carbon atoms, chlorine, bromine, carbonamido, sulphonamido, or phthalimido;

X_3 is hydrogen, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, chlorine or bromine;

X_4 is hydrogen, alkyl of 1 to 4 carbon atoms, chlorine or bromine; and

Y_1 and Y_2 are each hydrogen, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, chlorine or bromine.

4,177,196

EPOXIDATION

Anthony M. Hildon, Tattenhall, and Peter F. Greenhalgh, Widnes, both of England, assignors to Interox Chemicals Limited, London, England

Continuation-in-part of Ser. No. 649,747, Jan. 16, 1976, Pat. No. 4,071,541. This application Jun. 15, 1977, Ser. No. 806,944

The portion of the term of this patent subsequent to Jan. 31, 1995, has been disclaimed.

Int. Cl.[2] C07D *301/14*; C07C *179/10, 179/12*

U.S. Cl. 260—348.25 **8 Claims**

1. A continuous process for the production of a peracid in a chlorinated hydrocarbon solvent comprising the steps of:

(a) providing an aqueous phase comprising sulphuric acid, hydrogen peroxide and water;

(b) providing an organic phase comprising a chlorinated hydrocarbon solvent and carboxylic acid selected from the group consisting of acetic acid and propionic acid; and

(c) contacting said aqueous and organic phases countercurrently to produce an aqueous solution comprising sulphuric acid and water and an organic product solution comprising chlorinated hydrocarbon solvent and a peracid corresponding to said carboxylic acid.

8. A process for the production of an oxirane comprising:

(a) providing an aqueous phase comprising sulphuric acid, hydrogen peroxide and water;

(b) providing an organic phase comprising a chlorinated hydrocarbon solvent and carboxylic acid selected from the group consisting of acetic acid and propionic acid;

(c) continuously contacting said aqueous and organic phases countercurrently to produce an aqueous solution comprising sulphuric acid and water and an organic product solution comprising chlorinated hydrocarbon solvent and a peracid corresponding to said carboxylic acid; and

(d) reacting at least a portion of the peracid in said organic solution with an alkene to produce an oxirane.

4,177,197

CYCLIZATION SUBSTRATES AND 7α-SUBSTITUTED 19-NORSTEROID DERIVATIVES

Filippus J. Zeelen, Heesch, and Marinus B. Groen, Schayk, both of Netherlands, assignors to Akzona Inc., Asheville, N.C.

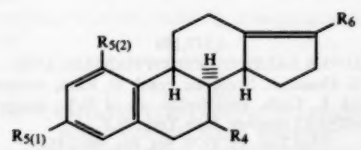
Filed Feb. 22, 1978, Ser. No. 880,151

Claims priority, application Netherlands, Feb. 24, 1977, 7701972

Int. Cl.[2] C07J *3/00*

U.S. Cl. 260—397.5 **4 Claims**

1. A compound of the formula



wherein:

(a) R_4 is a hydrocarbyl of one to two carbons substituted by halogen or alkoxy of one to two carbons, or alkoxy of one to four carbons;

(b) $R_{5(1)}$ and $R_{5(2)}$ are each H, alkyl, hydroxy, esterified hydroxy group of one to about ten carbons or etherified hydroxy group of one to about ten carbon atoms; and

(c) R_6 is an alkyl of one to about four carbon atoms.

4,177,198

PROCESS FOR PREPARING ALKALINE EARTH METAL MERCAPTIDES

Joseph M. Bohen, King of Prussia, Pa., assignor to Pennwalt Corporation, Philadelphia, Pa.

Filed Jan. 3, 1978, Ser. No. 866,738
Int. Cl.[2] C08H 3/00; C07C 69/00, 149/00
U.S. Cl. 260—399 18 Claims

1. A process for preparing alkaline earth metal mercaptides of the general formula $M(SR)_2$, wherein M is alkaline earth metal selected from group IIa of the periodic table consisting of barium, calcium, magnesium and strontium and R is a hydrocarbon radical having from 1 to 22 carbon atoms and is selcted from the group consisting of alkyl, cycloalkyl, aryl and mixed alkyl-aryl, said hydrocarbon radicals can optionally have a noninterfering substituent selected from the group consisting of halogen,

$$-XH, -XR^2, -X-\overset{Y}{\overset{\|}{C}}R^2 \text{ and } -\overset{Y}{\overset{\|}{C}}-XR^2$$

where R^2 is a hydrocarbon radical having from 1–20 carbon atoms and is selected from the group consisting of alkyl, alkenyl, cycloalkyl, aryl and mixed alkyl-aryl with the proviso that R^2 may be further substituted with inert substituents and X and Y are independently selected from the group consisting of oxygen and sulfur, comprising:

(1) forming a mixture in a reactor of:
  (a) a metal oxide of the general formula MO or a metal hydroxide of the formula $M(OH)_2.xH_2O$, wherein x is a number from 0 to 16; and
  (b) an alcohol of the general formula R'OH wherein R' is a hydrocarbon radical of 1–22 carbon atoms selected from the group consisting of alkyl, cycloalkyl, aryl, and mixed alkyl-aryl, with the proviso that said hydrocarbon radical may be optionally substituted with noninterfering inert substituents;
(2) subjecting the mixture of (1) to reaction conditions for sufficient time to form a metal alkoxide $M(OR')_2$ and water;
(3) separating the water from the mixture of (2) to provide the metal alkoxide $M(OR')_2$;
(4) forming a reaction mixture of the metal alkoxide $M(OR')_2$ of (3) and a mercaptan of the general formula HSR;
(5) subjecting the mixture of (4) to reaction conditions for sufficient time to provide the metal mercaptide $M(SR)_2$; and then
(6) separating the metal mercaptide $M(SR)_2$ from the remainder of the mixture of (5).

4,177,199

SILVER SALTS OF PHOSPHANILIC ACID

Edmund S. Granatek, Syracuse; Frank D. Ruva, Auburn, and Frederick L. Grab, Fayetteville, all of N.Y., assignors to Bristol-Myers Company, New York, N.Y.

Filed Dec. 11, 1978, Ser. No. 968,315
Int. Cl.[2] C07F 1/10
U.S. Cl. 260—430 12 Claims

1. A silver salt of phosphanilic acid.

4. The process for preparing a silver salt of phosphanilic acid which comprises mixing an aqueous suspension of phosphanilic acid with an aqueous solution containing approximately either one or two moles of silver nitrate per mole of phosphanilic acid to form a mixture which is then mixed with a water-miscible organic solvent to precipitate the desired product.

4,177,200

SILYL PHOSPHATES AS NEUTRALIZING AGENTS FOR ALKALI METAL HYDROXIDES

John S. Razzano, Watervliet; Louis P. Petersen, Latham, and Bruce A. Ashby, Schenectady, all of N.Y., assignors to General Electric Company, Waterford, N.Y.

Filed Nov. 25, 1977, Ser. No. 854,562
Int. Cl.[2] C07F 7/08
U.S. Cl. 260—448.2 N 24 Claims

1. A silyl phosphate which is an improved neutralizing agent for alkali metal hydroxides in silicone reactions comprising the reaction product of a siloxane selected from the class consisting of siloxanes of the formula,

$$\left[R-\overset{R}{\overset{|}{\underset{R}{\underset{|}{Si}}}}-O \right]_2$$

and siloxane of the formula,

$$R_3Si \left| O\overset{R}{\overset{|}{\underset{R}{\underset{|}{Si}}}} \right|_x OSiR_3$$

with a halophosphorous compound selected from the class consisting of PO Cl_3 and PO Br_3 where R is a hydrocarbyl radical free of aliphatic unsaturation and x varies from 1 to 20.

4,177,201

PREPARATION OF SILICON-FUNCTIONAL POLYORGANOSILOXANES

Armand de Montigny, Leverkusen, and Hans-Heinrich Moretto, Cologne, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Dec. 29, 1978, Ser. No. 974,412
Claims priority, application Fed. Rep. of Germany, Jan. 21, 1978, 2802668
Int. Cl.[2] C07F 7/08
U.S. Cl. 260—448.2 E 4 Claims

1. A process for the preparation of an equilibrated acyloxy-containing organopolysiloxane comprising reacting at a temperature of up to about 135° C. a chlorosilane of the formula

$$R_aR'_bSiCl_{(4-a-b)}$$

wherein
  a=0, 1, 2 or 3
  b=0, 1, 2 or 3, and
  a+b is at most 3,
or a partial hydrolysis product thereof, with one or more organosiloxanes, which can contain in appropriately alternating arrangement the units

$$[R_2R''—SiO_4] [RR''—SiO] [R''—SiO_{3/2}] [SiO_2]$$

wherein
  R and R' each independently is hydrogen or an aliphatic, aromatic saturated or unsaturated optionally halogen or cyano-substituted monovalent hydrocarbon radical with up to 18 C atoms, and
  R'' is hydrogen, chlorine, hydroxyl, or an optionally halogen or cyano-substituted monovalent hydrocarbon radical with up to 18 C atoms,
in the presence of a proton acid siloxane-equilibration catalyst, and at least about 1.1 times the molar amount of a monobasic carboxylic acid based on the silicon-bonded chlorine atom, the

number of all the Si—Cl groups in the reactants exceeding the number of all the Si—OH groups.

4,177,202

METHANATION OF SYNTHESIS GAS

Clarence D. Chang, Princeton, and William H. Lang, Pennington, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 775,133, Mar. 7, 1977, abandoned. This application Jun. 26, 1978, Ser. No. 918,878

Int. Cl.[2] C07C *1/04*

U.S. Cl. 260—449 R **1 Claim**

1. In a process for converting synthesis gas comprising carbon monoxide and hydrogen to gases rich in methane and increased ethane which comprises,

contacting synthesis gas at a temperature in the range of 700° to 1500° F. and pressure in the range of 20 to 100 atmospheres in the presence of a sulfur reactant material with a catalyst comprising vanadium and molybdenum on an alumina support material and

recovering a high BTU product gas rich in methane and ethane.

4,177,203

PROCESS FOR THE PRODUCTION OF HYDROCARBONS AND OXYGEN-CONTAINING COMPOUNDS AND CATALYSTS THEREFOR

Herbert Kölbel, and Klaus D. Tillmetz, both of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin, Fed. Rep. of Germany

Continuation of Ser. No. 657,470, Feb. 12, 1976, abandoned. This application Oct. 6, 1977, Ser. No. 840,059

Int. Cl.[2] C07C *1/04, 27/06*

U.S. Cl. 260—449.6 R **6 Claims**

1. A process for the synthesis of gaseous hydrocarbons and oxygenated derivatives thereof, in which the product distribution spectrum is shifted in the direction of chain lengths of C_2 to C_4, said process including the steps of pretreating a catalyst with an activating gas selected from the group consisting of (1) carbon monoxide and hydrogen in admixture and (2) carbon monoxide and hydrogen in succession, at an activating temperature of about 10° C. to about 60° C. in excess of the synthesis start-up temperature, the pretreatment with activating gas (1) being performed by contacting the activating gas with the catalyst until the carbon dioxide content of the residual gas asymptotically tends toward a limit value, the pretreatment with activating gas (2) being performed by contacting the carbon monoxide with the catalyst until the carbon dioxide content of the residual gas asymptotically tends toward a limit value and by contacting hydrogen with the catalyst for 10 to 24 hours, said catalyst comprising a composition selected from the group consisting of (a) an oxide or hydroxide of manganese and (b) oxides or hydroxides of manganese and iron, the composition containing manganese in amount of at least about 70% and iron in amount of less than about 30% of manganese plus iron, by weight, and thereafter lowering the temperature of the activated catalyst to the synthesis start-up temperature, and contacting the activated catalyst with a synthesis gas containing carbon monoxide and hydrogen at synthesis temperatures from about 220° C. to about 375° C. and at pressures from about 1 bar to about 60 bars.

4,177,204

PEROXY COMPOUNDS

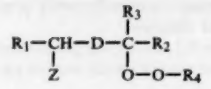
Orville L. Mageli, Kenmore, N.Y., and William A. Swarts, Dover, N.J., assignors to Pennwalt Corporation, Philadelphia, Pa.

Division of Ser. No. 596,778, Jul. 17, 1975, Pat. No. 4,129,700. This application Aug. 28, 1978, Ser. No. 937,658

Int. Cl.[2] C07C *69/02*

U.S. Cl. 260—453 RZ **2 Claims**

1. A peroxy compound of the formula:



where:

(a) R_1 is hydrogen or an alkyl of 1–4 carbons;

(b) R_2 and R_3 are an alkyl of 1–4 carbons;

(c) R_4 is

(d) Z is

(e) R_6 and R_8 are independently H, an alkyl of 1–8 carbons, cycloalkyl of 5 or 6 carbons, phenyl or alkylphenyl of 7–10 carbons; and

(f) D is ethynyl diradical, diethynyl diradical or alkyl diradical having 1–8 carbons.

4,177,205

PROCESS FOR THE PREPARATION OF HIGHLY STABLE LIQUID CARBODIIMIDE-CONTAINING POLYISOCYANATE COMPOSITIONS

Robert L. Schaaf, Wyandotte; Peter T. Kan, Plymouth, and Moses Cenker, Trenton, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Nov. 20, 1978, Ser. No. 962,232

Int. Cl.[2] C07C *119/055*

U.S. Cl. 260—453 AM **7 Claims**

1. A process for the preparation of highly stable liquid carbodiimide-containing 4,4'-diphenylmethane diisocyanate having an isocyanate content of from 20 to 32 percent by weight comprising

(a) heating 4,4'-diphenylmethane diisocyanate or mixtures containing same at a temperature of from 60° C. to 120° C. for a period of from one hour to ten hours in the presence of tris(chloromethyl)phosphine oxide,

(b) stopping the carbodiimide formation by adding to the reaction mixture a quenchant selected from the group consisting of magnesium chloride hydrate, stannous chloride and trichlorosilane,

(c) maintaining the reaction mixture at a temperature of from 60° C. to 120° C. for a period of from 0 hour to six hours and

(d) cooling the product resulting from (c) to room temperature.

4,177,206

POLYISOCYANATES CONTAINING SULPHONIC ACID AND PHOSPHONATE GROUPS

Hans-Joachim Scholl, Cologne, and Dieter Dieterich, Leverkusen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed May 19, 1978, Ser. No. 907,515

Claims priority, application Fed. Rep. of Germany, Jun. 3, 1977, 2725208

Int. Cl.[2] C07C *119/048, 143/24, 143/68*; C07F *9/09*

U.S. Cl. 260—456 P **7 Claims**

1. Polyisocyanate mixtures which are liquid at room temperature and which

(a) contain from 10–42%, by weight of aromatically bound isocyanate groups optionally partly present in the form of carbamic acid chloride,

(b) contain from 0.5–5% by weight of sulphur in the form of sulphonic acid groups which may be partly neutralized or esterified,

(c) contain from 0.5–5% by weight of phosphorus in the form of phosphonic acid alkyl ester groups or phosphonic acid aralkyl ester groups and

(d) have a viscosity of from 10–50,000 cP at 25° C., and which are prepared by reacting aromatic polyisocyanate mixtures with chlorosulphonic acid at −10° C. in the presence of a trialkyl phosphite or tris-(aralkyl)-phosphite which may be substituted with halogen.

4,177,207

PETROLEUM SULFONATES

Marvin L. Nussbaum, Skokie, and Edward A. Knaggs, Deerfield, both of Ill., assignors to Stepan Chemical Company, Northfield, Ill.

Continuation-in-part of Ser. No. 676,470, Apr. 13, 1976, Pat. No. 4,148,821, which is a continuation-in-part of Ser. No. 515,013, Oct. 16, 1974, abandoned, which is a continuation-in-part of Ser. No. 432,439, Jan. 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 9,065, Feb. 5, 1970, abandoned. This application Mar. 3, 1978, Ser. No. 883,128

The portion of the term of this patent subsequent to Apr. 10, 1996, has been disclaimed.

Int. Cl.[2] **C07C** *139/00;* **C09K** *3/00*

U.S. Cl. 260—504 R **50 Claims**

1. A method for preparing petroleum sulfonates comprising the sequential steps of

(I) intimately contacting from about 5 to 40 parts by weight of sulfur trioxide with 100 parts by weight of a flowable liquid mixture, which comprises on a 100 weight percent total mixture basis:

(A) from about 85 to 99.5 weight percent of a petroleum oil feed stock, and

(B) from about 0.5 to 15 weight percent of an additive, said petroleum oil feed stock being characterized by

(a_1) having an API gravity ranging from about 5° to 60° at 60° F.,

(a_2) having a boiling point (corrected atmospheric) ranging from about −20° to 1400° F., and

(a_3) containing from about 10 to 95 weight percent (100 weight percent total stock basis) of sulfonatable components,

said additive being characterized by

(b_1) being comprised of unsulfonatable organic radical portions possessing an average molecular weight range from about 55 to 6000,

(b_2) having a boiling point in the range from about 212° to 932° F. corrected atmospheric, and

(b_3) a preponderance of such radicals each having attached at least one proton replaceable by a sulfo group and at least one moiety selected from the group consisting of an aromatic nucleus, an olefinic carbon pair, and an oxygen atom directly bonded to a carbon atom by at least one bond,

said contacting being conducted at a temperature of from about 77° to 392° F., said contacting being continued for a time at least sufficient to sulfonate at least about 10 weight percent of the total sulfonatable components present in said petroleum oil feed stock so as to attain a crude acidic sulfonation reaction mixture; and

(II) intimately contacting said crude acidic reaction mixture with about 0.5% to about 20% by weight, on a 100 weight percent total reaction mixture basis, of water and maintaining the so-attained mixture at a temperature of about 50° to about 150° C. for a period of time ranging from about one minute to about 60 minutes.

4,177,208

PROCESS FOR PREPARING SULPHONIC ACIDS AND SULPHONATES

Aristide Boy; Henri Galy, both of Pau; Raoul Ivaldi, Orthez, and Hubert Passedroit, Gan, all of France, assignors to ATO Chemie, Paris, France

Continuation-in-part of Ser. No. 732,120, Oct. 13, 1976, abandoned, which is a continuation-in-part of Ser. No. 645,092, Dec. 29, 1975, abandoned, which is a continuation of Ser. No. 507,246, Sep. 18, 1974, abandoned, which is a continuation of Ser. No. 169,145, Aug. 4, 1971, abandoned. This application Apr. 12, 1978, Ser. No. 895,795

Claims priority, application France, Aug. 7, 1970, 70.29211; Jul. 22, 1971, 71.26794

Int. Cl.[2] **C07B** *13/00;* **C07C** *143/02*

U.S. Cl. 260—504 S **10 Claims**

1. A process for separating the sulphonic acids in an untreated paraffin sulphonic solution containing in addition to said paraffin sulphonic acids, sulphuric acid, water, and non-sulphonated paraffins, which comprises:

(a) admixing with the paraffin sulphonic acid solution, at least one slightly polar alcohol selected from the group consisting of aliphatic and cycloaliphatic alcohols containing at least 5 carbon atoms, having a solubility in water less than 7% by weight which forms an azeotrope with water, thereby forming a mixture having an organic phase containing paraffin sulphonic acids dissolved therein and an aqueous phase containing the sulphuric acid;

(b) separating said organic phase from said aqueous phase;

(c) neutralizing said separated organic phase by admixture with a composition selected from the group consisting of alkali metal hydroxides, alkali metal carbonates, alkaline earth metal oxides, alkaline earth metal hydroxides, and alkaline earth metal carbonates thereby converting the sulphonic acids present in said organic phase into sulphonates, and forming a neutralized organic phase wherein the ratio of the amount of water to the amount of slightly polar alcohol in said neutralized phase is at most equal to the corresponding ratio for the azeotrope which forms between water and the slightly polar alcohol; and

(d) removing the volatile components from the neutralized organic phase to recover the sulphonates under temperature and pressure conditions whereby said sulphonates are in a molten state.

4,177,209

UREYLENEBIS(ANIONIC SUBSTITUTED PHENYLENE CARBONYL)IMINO NAPHTHALENE SULFONIC ACIDS AND NAPHTHALENE CARBOXYLIC ACIDS AND THEIR SALTS

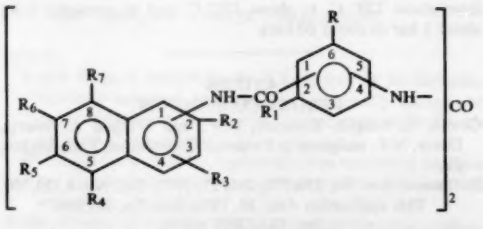
Ransom B. Conrow, Pearl River, and Seymour Bernstein, New City, both of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 778,398, Mar. 17, 1977, Pat. No. 4,129,590. This application Oct. 4, 1978, Ser. No. 948,604

Int. Cl.[2] **C07C** *143/30, 143/83*

U.S. Cl. 260—506 **8 Claims**

1. A compound of the formula:



wherein R is COOY, wherein Y is selected from the group consisting of hydrogen, alkali metal and C_1–C_6 alkyl; R_1 is

hydrogen; R_4, R_5 and R_6 are selected from the group consisting of hydrogen and SO_3X, wherein X is alkali metal; R_2 is hydrogen; with the proviso that there is no R_1 or R_2 substituent when the bridgehead carbonylimino is attached at the carbon 2-position of the respective ring; with the further proviso that each naphthalene moiety must contain two or three SO_3X substituents, wherein X is as previously defined; R_3 is selected from the group consisting of hydrogen, SO_3X and COOY, wherein X and Y are as previously defined; R_7 is selected from the group consisting of hydrogen, hydroxy and SO_3X, wherein X is as previously defined; and other pharmaceutically acceptable salts thereof.

4,177,210

HYDRATION OF ACRYLONITRILE TO ACRYLAMIDE

William N. Vanderkooi, and Gary L. Jewett, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 5, 1978, Ser. No. 922,133
Int. Cl.[2] C07C *102/08*
U.S. Cl. 260—561 N **16 Claims**

1. In a process for hydration of acrylonitrile to acrylamide comprising contacting acrylonitrile with water at a temperature between about 50° C. and about 175° C. in the presence of a heterogeneous nitrile hydration catalyst, the improvement wherein the acrylonitrile and water are substantially free of oxazole.

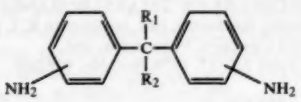
4,177,211

PROCESS FOR THE PREPARATION OF BIS(AMINOPHENYL)ALKANES

Kwok K. Sun, Hamden, Conn., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Apr. 21, 1978, Ser. No. 898,646
Int. Cl.[2] C07C *85/02*
U.S. Cl. 260—570 D **15 Claims**

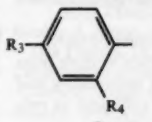
1. A process for the preparation of a bis(aminophenyl)alkane having the formula



wherein R_1 and R_2, taken individually, represent methyl and lower-alkyl, respectively, and R_1 and R_2 taken together with the C atom to which they are attached represent the residue of a 1,1-cycloalkylidene group having from 5 to 7 ring carbon atoms, inclusive; which process comprises reacting

(a) the appropriately substituted bis(phenyl)alkane having the formula:

wherein R_1 and R_2 have the significance defined above and A is a member selected from the class consisting of



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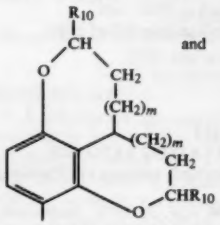
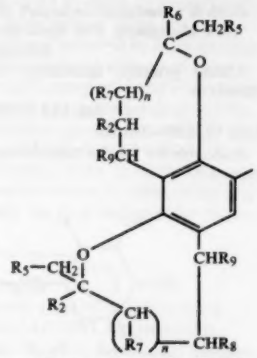


and



wherein R_3 and R_4 each represent lower alkoxy; R_5, R_6, R_7, R_8, R_9 and R_{10} are each independently selected from the group consisting of hydrogen and lower-alkyl; and n and m are integers from 0 to 1; with

(b) at least 2 moles, per mole of said bis-(phenyl)alkane, of an aniline acid addition salt at a temperature in the range of 100° to 250° C.

4,177,212

PROCESS FOR PREPARING BIS(N,N-DIALKYLAMINO)ALKYL ETHERS EMPLOYING SULFUR OXYCHLORO-CONTAINING COMPOUNDS

Fedor Poppelsdorf, Charleston, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Filed May 1, 1978, Ser. No. 901,812
Int. Cl.[2] C07C *85/24, 93/10*
U.S. Cl. 260—584 R **17 Claims**

1. A process for producing bis-(N,N-dialkylamino)-alkyl ether having the formula $(R_2NR')_2O$, wherein R is a methyl or ethyl group and R′ is a bivalent alkylene group having from 2 to 3 carbon atoms, which comprises:

(a) reacting sodio N,N-dialkylaminoalkoxide of the formula $R_2NR'ONa$, wherein R and R′ are defined above, with a sulfur oxychloro-containing compound selected from the group consisting of sfuryl chloride, thionyl chloride and chlorosulfonic acid in an amount of from about 0.10 to about 0.50 moles of said sulfur oxychloro-containing compound per mole of sodio N,N-dialkylaminoalkoxide at a temperature of from about 15° C. to about 115° C. in the presence of:

(I) an organic diluent/dispersant in an amount ranging from 0 to about 60 weight percent based on the amount of sodio N,N-dialkylaminoalkoxide and N,N-dialkylaminoalkanol employed, and

(II) an N,N-dialkylaminoalkanol of the formula $R_2NR'OH$, wherein R and R′ are defined above, that is

present in an amount such that the molar ratio of sodio N,N-dialkylaminoalkoxide to N,N-dialkylaminoalkanol ranges from about 1:1 to about 1:5,

to produce an intermediate reaction product mixture,

(b) heating the intermediate reaction product mixture from step (a) to an elevated temperature and maintaining said elevated temperature for a time period sufficient to produce bis(N,N-dialkylamino)alkyl ether, and

(c) recovering the bis-(N,N-dialkylamino)alkyl ether.

4,177,213

PROCESS FOR BENZYLATING KETONES

Andreas Schmidt, Reinach, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

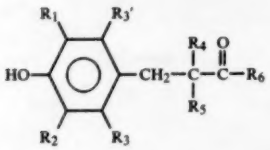
Continuation of Ser. No. 682,000, Apr. 30, 1976, abandoned, which is a continuation-in-part of Ser. No. 517,356, Oct. 23, 1974, abandoned. This application Sep. 16, 1977, Ser. No. 833,941

Claims priority, application Switzerland, Nov. 1, 1973, 15404/73

Int. Cl.[2] C07C *45/00*

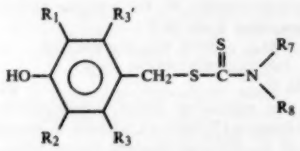
U.S. Cl. 260—590 R **5 Claims**

1. A process for the manufacture of compounds of the formula I



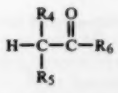
(I)

in which R_1 denotes a straight-chain or branched alkyl group, a cycloalkyl group or an aralkyl group, R_2 denotes hydrogen, a straight-chain or branched alkyl group, a cycloalkyl group or an aralkyl group, R_3 and R'_3 independently of one another denote hydrogen or a lower alkyl group, or R_1 conjointly with R'_3, or R_2 conjointly with R_3, denote tetramethylene, R_4 and R_5 independently of one another denote hydrogen, phenyl or alkyl or conjointly denote alkylene, R_6 denotes alkyl, phenyl or alkylphenyl, or, conjointly with R_4 and R_5, denotes alkanetriyl, characterised in that 1 mol of a compound of the formula II



(II)

wherein R_1, R_2, R_3 and R'_3 have the meaning indicated above and R_7 and R_8 independently of one another denote a straight-chain or branched alkyl group, or conjointly, with the inclusion of the nitrogen atom, denote a saturated, heterocyclic ring, is reacted in the presence of a base selected from an alkali metal hydroxide or alcoholate at a temperature of −20° C. to +150° C. with one mol of a compound of the formula III



(III)

wherein R_4, R_5 and R_6 have the meaning indicated above.

4,177,214

PROCEDURE FOR THE PREPARATION OF SATURATED AND UNSATURATED DIALDEHYDES

Francesco Siclari, Barlassina; Pietro P. Rossi, Garlasco; Cesare Guaita, Tradate, and Vito L'Acqua, Mil an, all of Italy, assignors to Snia Viscosa Societa' Nazionale Industria Applicazioni Viscosa S.p.A., Milan, Italy

Filed Dec. 28, 1977, Ser. No. 865,248

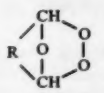
Claims priority, application Italy, Dec. 29, 1976, 30939 A/76

Int. Cl.[2] C07C *45/22*

U.S. Cl. 260—601 R **16 Claims**

1. A method for the preparation of unsaturated α,ω-dialdehydes of the formula:

where R represents an olefin chain having one or more unsaturations, comprising selectively hydrogenating the monoozonide of the polyunsaturated cycloolefin represented by the formula:



in a polar solvent solution at a temperature from the freezing point of said solvent to 100° C. with excess hydrogen gas at a pressure from ambient to 50 atmospheres in the presence of a catalyst system comprising:

(A) 0.1 to 1 percent by weight based on said monoozonide of a noble metal selected from the group consisting of palladium and platinum and carried on a carrier selected from the group consisting of alumina, coal, and barium sulphate, and

(B) 0.5 to 10 times the weight of said noble metal of at least one compound of a heavy metal selected from the group consisting of lead, bismuth, cadmium, and antimony, until no more hydrogen is taken up, whereby only the peroxide function of said monoozonide of a poly-unsaturated cycloolefin is hydrogenated, thereby leaving the double bonds unaffected.

4,177,215

RECOVERY OF TRIARYLBORANES

William C. Seidel, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jul. 17, 1978, Ser. No. 925,550

Int. Cl.[2] C07F *5/02*

U.S. Cl. 260—606.5 B **7 Claims**

1. A process for separating triarylboranes from other aryl substituted boranes wherein the boranes are present in a basic solution and wherein the weight ratio of the trisubstituted boranes to the other substituted boranes in the solution is sufficiently low so that coprecipitation of the boranes can occur which process comprises neutralizing said solution to a pH not less than the pH defined by the equation

$$pH = pKn + \log (X)$$

wherein pKn is negative log of the product of the dissociation constant and the solubility constant, and X is the molar concentration of the substituted boranes other than the triaryl substituted borane while maintaining the ionic strength of the solution at at least about 1 molar upon completion of the neutralization.

4,177,216

NOVEL TRIBUTYL (2,5-DIHYDROXYPHENYL)PHOSPHONIUM HYDROXIDE INNER SALTS

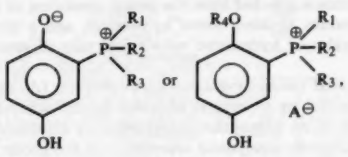
George A. Doorakian, Waltham, and Lawrence G. Duquette, Maynard, both of Mass., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 674,019, Apr. 5, 1976, Pat. No. 4,132,706, which is a continuation of Ser. No. 481,599, Jun. 21, 1974, abandoned. This application Sep. 26, 1978, Ser. No. 945,945

Int. Cl.[2] C07F 9/54

U.S. Cl. 260—606.5 F 5 Claims

1. A tri-n-butyl(2,5-dihydroxyphenyl)phosphonium hydroxide inner salt or a hydrolyzed derivative thereof corresponding to the formula



I II

wherein R_1–R_3 are each n-butyl, R_4 is hydrogen, benzyl or lower alkyl,, and $A^{\ominus}$ is a compatible neutralizing anion.

4,177,217

CONTINUOUS PROCESS FOR CONVERSION OF DIMETHYLDICYCLOPENTADIENE TO ENDO-DIMETHYLDICYCLOPENTADIENE, A MISSILE FUEL

Edward J. Janoski, Havertown; Richard E. Mitchell, Boothwyn, and Abraham Schneider, Overbrook Hills, all of Pa., assignors to Suntech, Inc., Philadelphia, Pa.

Filed Sep. 28, 1977, Ser. No. 837,127

Int. Cl.[2] C07C 13/00

U.S. Cl. 585—253 5 Claims

1. Process for the continuous conversion of endodimethyldicyclopentadiene to exo-tetrahydrodimethyldicyclopentadiene comprising:

a. hydrogenating endo dimethyldicyclopentadiene by contacting the diene with nickel on a silica-alumina catalyst wherein the volume of the diene charged to the volume of the catalyst per hour is in the range from about 0.1 to about 2.0 and the moles of hydrogen present per mole of the diene is in the range from about 5 to about 40 and the contacting temperature is in the range of between from about 165° C. to about 204° C. and the pressure is in the range from about 200 psig to about 3000 psig and continuing the contacting until the diene is hydrogenated to tetrahydrodimethyldicyclopentadiene; and

b. isomerizing, in the presence of hydrogen, the tetrahydrodimethyldicyclopentadiene by contacting it with nickel on a silica-alumina catalyst wherein the volume of the tetrahydrodimethyldicyclopentadiene charged to the volume of the catalyst per hour is in the range from about 0.1 to about 3.0 and the contacting temperature is in the range from about 220° C. to about 260° C., and the pressure is in the range from about 10 psig to about 1500 psig and continuing the contacting of the tetrahydrodimethyldicyclopentadiene until exo-tetrahydrodimethyldicyclopentadiene is formed.

4,177,218

DEHYDROGENATION PROCESS UTILIZING MULTIMETALLIC CATALYTIC COMPOSITE

George J. Antos, Arlington Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 803,693, Jun. 6, 1977, Pat. No. 4,101,418, which is a continuation-in-part of Ser. No. 699,748, Jun. 24, 1976, Pat. No. 4,046,711. This application Jun. 5, 1978, Ser. No. 912,708

The portion of the term of this patent subsequent to Jul. 18, 1995, has been disclaimed.

Int. Cl.[2] C07C 5/36

U.S. Cl. 585—379 17 Claims

1. A process for the catalytic dehydrogenation of a dehydrogenatable hydrocarbon which comprises passing said hydrocarbon in contact with a germanium-promoted platinum group metal catalyst at a liquid hourly space velocity of from about 1 to about 40, a temperature of from about 375° to about 650° C., a pressure of from about 0.1 to about 10 atmospheres, and a hydrogen/hyrocarbon mole ratio of from about 1:1 to about 20:1, said catalyst having been prepared by impregnating a porous high surface area carrier material with a non-aqueous solution of a platinum group metal compound and a halo-substituted germane selected from the group consisting of chloro-, fluoro-, bromo-, and iodo-substituted germanes containing less than 4 halo substituents in an amount to provide a final catalyst containing from about 0.05 to about 1.0 wt. % platinum group metal and from about 0.05 to about 1.0 wt. % germanium, and drying, calcining and reducing the thus impregnated carrier material.

4,177,219

PROCESS FOR SELECTIVE ETHYL SCISSION OF ETHYLAROMATICS TO METHYLAROMATICS

Allen I. Feinstein, Wheaton, Ill.; Ralph J. Bertolacini, Chesterton, Ind., and Dae K. Kim, Naperville, Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Apr. 24, 1978, Ser. No. 899,314

Int. Cl.[2] C07C 3/58

U.S. Cl. 585—489 15 Claims

1. A process for selective ethyl scission of ethyl aromatics to methyl aromatics which process comprises contacting an alkylaromatic feed stream comprising ethyltoluene with hydrogen in the presence of a catalyst composition comprising a metal component selected from the group consisting of a Group VIII metal and a Group VIII metal promoted with zinc, the said group VIII metal selected from the gooup consisting of ruthenium, rhodium, and iridium, upon a high surface area carrier of highly purified alumina with a surface area of at least 100 m^2/g. and containing essentially no silica at a temperature within the range from about 600° F. to about 1000° F., and wherein about 0.01 to about 20 weights of hydrocarbon per weight of catalyst is present.

4,177,220

1-OCTEN-7-YNE PRODUCTION

Kenzie Nozaki, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Nov. 6, 1978, Ser. No. 957,780

Int. Cl.[2] C07C 3/06, 11/28

U.S. Cl. 585—505 9 Claims

1. The process for preparing 1-octen-7yne which comprises reacting vinyl acetylene and butadiene in the presence of formic acid or a salt of formic acid, optionally a solvent, a catalytic amount of palladium and a tertiary organosphosphorus ligand having the formula:

$$(RO)_aPR_b$$

wherein R is aryl, alkyl, aralkyl or alkaryl with less than about 20 carbon atoms wherein the Rs attached to the phosphorus

are the same or different, O is oxygen, a is an integer from 0 to 3 and b is 3-a.

4,177,221

SUBSTRATE-LESS, THERMOSETTING SYNTHETIC RESIN FOIL

Eckehard Schamberg, Essen-Kupferdreh; Jürgen Fock, Düsseldorf; Otto Klocker, Essen, and Eberhard Esselborn, Gelsenkirchen-Horst, all of Fed. Rep. of Germany, assignors to Th. Goldschmidt AG, Fed. Rep. of Germany

Filed Nov. 2, 1977, Ser. No. 847,753

Claims priority, application United Kingdom, Nov. 8, 1976, 46377/76

Int. Cl.[2] C08L *29/14*

U.S. Cl. 525—244 **6 Claims**

1. A thermosetting, substrate-free, storage-resistant synthetic resin foil which is hard, scratch- and abrasion-proof in the hardened state, comprising:

(a) about 60 to 95% by weight of an unsaturated hardenable polyester resin,

(b) about 1 to 15% by weight of a cross-linking agent for the polyester resin,

(c) about 5 to 40% by weight of a polyvinyl acetal,

(d) about 1 to 15% by weight of the N-methoxy methylamide of acrylic or methacrylic acid,

(e) and at least one hardening catalyst, and optionally dyestuffs, pigments and/or fillers.

4,177,222

BLOCK COPOLYMER OF POLY(DIOXA-AMIDE) AND POLYAMIDE

Robert M. Thompson, Wilmington, Del., assignor to Suntech, Inc., Philadelphia, Pa.

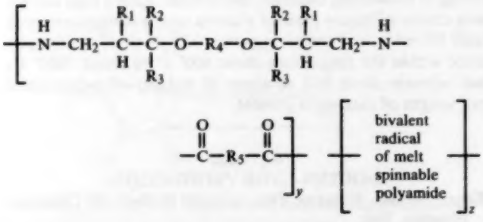
Division of Ser. No. 970,409, Dec. 18, 1978, which is a continuation-in-part of Ser. No. 769,246, Feb. 16, 1977, Pat. No. 4,130,602, which is a continuation-in-part of Ser. No. 557,717, Mar. 12, 1975, abandoned, which is a continuation-in-part of Ser. No. 418,524, Nov. 14, 1973, abandoned. This application Jan. 19, 1979, Ser. No. 4,777

The portion of the term of this patent subsequent to Nov. 28, 1995, has been disclaimed.

Int. Cl.[2] C08L *77/00*

U.S. Cl. 525—432 **6 Claims**

1. A block copolymer having a molecular weight of about 5000–100,000 and the following repeating structural formula:



wherein

R_1, R_2 and R_3 are selected from the group consisting of H, C_1–C_{10} alkyls and C_3–C_{10} isoalkyls;

R_4 is selected from the group consisting of C_1–C_{10} alkylenes and C_3–C_{10} isoalkylenes;

R_5 is selected from the group consisting of C_0–C_{10} alkylenes and C_3–C_{10} isoalkylenes;

said melt spinnable polyamide is selected from the group consisting of nylon 6, 10; nylon-6; nylon-6,6; nylon-11; MXD-6; PACM-9; PACM-10 and PACM-12; and

y=4–200

z=4–200.

4,177,223

PRESS-CURABLE FLUOROPOLYMER COMPOSITIONS AND PROCESS

Richard J. Arhart, and Arthur Nersasian, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 27, 1977, Ser. No. 864,606

Int. Cl.[2] C08F *8/00, 14/22*

U.S. Cl. 525—331 **17 Claims**

1. A vulcanizable highly fluorinated fluoroelastomer composition comprising

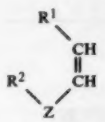
(A) a copolymer of vinylidene fluoride with at least one other ethylenically unsaturated fluoromonomer,

(B) an accelerator effective in promoting the crosslinking of copolymer (A) with an aromatic polyhydroxy compound in a weakly basic system,

(C) a substance selected from the group consisting of divalent metal oxides, divalent metal hydroxides, and a mixture of such oxides or hydroxides with metal salts of weak acids, and

(D) a blocked vulcanizing agent for copolymer (A) consisting of an acetal or thioacetal obtained by an acid catalyzed reaction of an appropriate vinyl ether or thioether with a polyhydroxylic compound selected from the group consisting of di-, tri-, and tetrahydroxybenzenes, -naphthalenes, and -anthracenes; and bisphenols; all the above compounds being unsubstituted or substituted with chlorine, bromine, fluorine, carboxyl, or acyl; and 2,4-dihydroxybenzophenone;

the vinyl ether or thioether having the following formula (I):


(I)

wherein

Z is O or S;

R^1 can be hydrogen; each of R^1 and R^2 independently can be a C_1–C_{18} alkyl, phenyl or substituted phenyl, a C_5–C_7 cycloalkyl or substituted cycloalkyl, a C_3–C_8 alkenyl, a C_3–C_8 alkynyl, or a C_5–C_7 cycloalkenyl;

when at least one of R^1 and R^2 is substituted phenyl or substituted cycloalkyl, their substituents being selected from the group consisting of C_1–C_6 alkyl, halogen, and C_1–C_6 alkoxy groups; or R^1 and R^2 can be joined together, the above compound of formula (1) being a ring having 5–7 members, which may be unsubstituted or substituted; if the ring is substituted, the substituents being selected from the same groups as those recited above for R^1 and R^2 other than hydrogen;

provided that when R^1 and R^2 are not joined together, Z can only be O.

4,177,224

ALTITUDE COMPENSATION VALVE

Minoru Yamanaka, and Akira Ii, both of Toyotashi, Japan, assignors to Aisin Seiki Kabushiki Kaisha and Toyota Jidosha Kogyo Kabushiki Kaisha, both of Aichi, Japan

Filed Apr. 24, 1978, Ser. No. 899,698

Claims priority, application Japan, Apr. 25, 1977, 52-47526

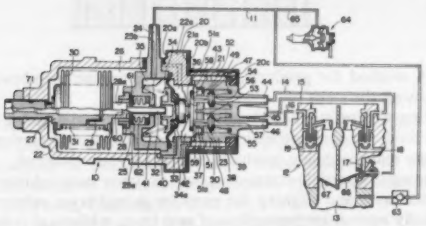
Int. Cl.[2] F02M *7/24*

U.S. Cl. 261—39 A **8 Claims**

1. A device for maintaining the same absolute ratio of air by fuel in the combustible mixture in the intake manifold of the vehicle engine regardless of whether the engine is moved to high altitude, said device comprising:

housing means defining in part first and second chambers connected to each other by a fluid passage and both connected to atmospheric pressure,

a flexible vacuum operated diaphragm extending in the second chamber to separate therefrom a cavity;
biasing means for urging the diaphragm to a first position;
first valve means through which the cavity and the first chamber is in intercommunication;
second valve means engaging the diaphragm and having an opening variable in proportion to a distance of vacuum actuated movement of the diaphragm, said second valve means being connected to the second chamber;
port means connecting to the second valve means for delivering air therefrom;
conduit means connecting the port means to the vehicle engine carburetors adjacent to a fuel injection nozzle;
an expansible bellows means in the first chamber containing an internal pressure approximately absolute vacuum;



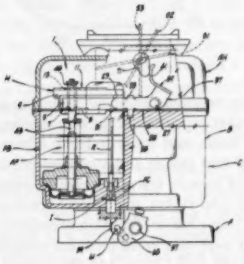
means operatively connecting said bellows means to said first valve means so that expansion of the bellows means is in a direction to close the first valve means;
conduit means interconnecting said cavity with the carburetor of the engine downstream of the throttle valve for reducing pressure within the cavity so that responsive movement of the diaphragm with the transmitting member is in a direction to enlarge opening of the second valve means, and
means operatively connecting said bellows means to the diaphragm so that a distance of vacuum actuated movement of the diaphragm from the first position to a second position is in accordance with the expansion of the bellows.

4,177,225

FUEL METERING ROD POSITION CONTROL

Kenneth A. Berkbigler, 1710 Vandover Rd., Fenton, Mo. 63026

Filed Jun. 12, 1978, Ser. No. 914,374
Int. Cl.² F02M 7/22
U.S. Cl. 261—50 A **4 Claims**



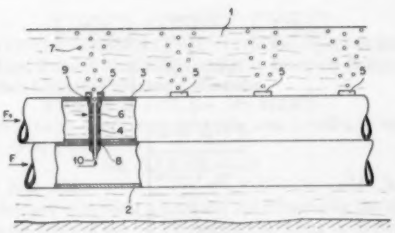
1. In a carburetor for an internal combustion engine, the carburetor comprising a carburetor body having an induction passage through which air is drawn into the engine, a throttle valve positioned in the passage and movable between an open and a closed position to control the quantity of air drawn into the engine, a fuel circuit through which fuel is drawn from a fuel bowl to the induction passage for mixing with air to form an air-fuel mixture combusted in the engine, a fuel metering rod responsive to movement of the throttle valve for varying the quantity of fuel flowing from the fuel bowl through the fuel circuit, the fuel metering rod being vertically movable relative to the fuel circuit inlet, a staging valve positioned in the induction passage and movable between an open and a closed position, the staging valve comprising a disk mounted on a rotatable shaft and functioning as a choke valve during engine cranking and warm-up and as an air valve during other engine operating conditions, the improvement comprising means responsive to opening and closing movements of the staging valve when it functions as an air valve for positioning the fuel metering rod relative to an inlet to the fuel circuit to control the quantity of fuel flowing through the fuel circuit as demand for air by the engine increases or decreases, the control means operating independently of the throttle valve to control the quantity of fuel flow and including a hangar assembly having a rotatable carrier from which the fuel metering rod is suspended, rotation of the carrier moving the fuel metering rod relative to the inlet, the hangar assembly having a stationary arm and the carrier being hingedly attached to one end of the stationary arm, a cam fixedly mounted on the shaft, and a bell crank pivotally mounted to the other end of the stationary arm, the bell crank being in contact with both the cam on the staging valve shaft and the movable carrier from which the fuel metering rod is suspended whereby movement of the staging valve produces rotation of the bell crank and a consequent rotation of the carrier thereby to change the position of the fuel metering rod relative to the fuel circuit inlet.

4,177,226

DEVICE FOR INJECTION OF A GAS IN A LIQUID

François Danel, St Martin d'Uriage, France, assignor to Alsthom-Atlantique, France

Continuation of Ser. No. 797,036, May 16, 1977, abandoned.
This application Aug. 10, 1978, Ser. No. 932,642
Claims priority, application France, May 25, 1976, 76 15785
Int. Cl.² C02C 5/04
U.S. Cl. 261—124 **1 Claim**



1. Apparatus for injecting separate small bubbles of gas into a body of liquid to be treated by such gas, comprising a plurality of spaced elongated tubes of small inside diameter, each of said tubes having an outer end portion in communication with the liquid to be treated and provided with a bubble emission opening adjacent to such liquid body, and each of said tubes having an inner end portion provided with a gas admission opening, a tubular member enclosing the outer end portion of each of said tubes and forming therewith a concentric annular chamber having a closed inner end and an open outer end located close to the emission opening of the enclosed tube, port means in each tubular member located intermediate the outer and inner ends of the chamber formed thereby and spaced inwardly from the bubble emission opening of the tube enclosed by said tubular member, means supplying gas under pressure through the admission openings of said tubes to cause the formation of successive, separate bubbles at the bubble emission openings of said tubes, and means supplying liquid under pressure into said annular chambers through the port

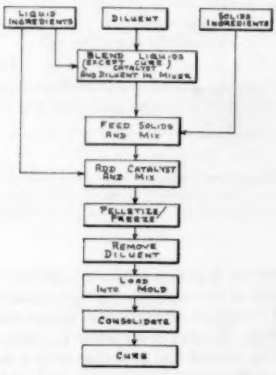
means of each tubular member to provide an annular liquid current along the outer end portion of the tube enclosed thereby and capable of generating an annular thrust on the gas bubbles forming at the emission opening of such tube, thereby causing such bubbles to be detached from such emission opening while small into said body of liquid, said means supplying gas under pressure to said tubes including a first conduit, and said means supplying liquid under pressure to said tubular members including a second conduit, the gas admission openings in said tubes being in communication with the interior of said first conduit, and said tubes and tubular members extending transversely of said second conduit through opposed inner and outer openings provided in said second conduit, the bubble emission openings of said tubes and the open outer ends of said annular chambers being both adjacent to said outer conduit openings, said first and second conduits being superimposed, the outer ends of said tubular members being secured to the edges of said outer openings provided in said second conduit, and the inner end of each of said tubular members being secured to the edge of its associated inner opening in said second conduit and the edge of an adjacent outer opening in said first conduit and coupling said conduits together.

4,177,227

LOW SHEAR MIXING PROCESS FOR THE MANUFACTURE OF SOLID PROPELLANTS

Kenneth L. Harvey, Pleasant Grove, and Howard D. Dixon, Salt Lake City, both of Utah, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Sep. 10, 1975, Ser. No. 612,435
Int. Cl.[2] C06B *45/10*
U.S. Cl. 264—3 R **2 Claims**



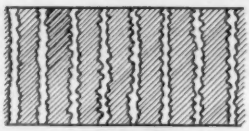
1. A low shear mixing process for preparing high solids, high viscosity solid rocket propellants consisting essentially of the steps of (a) blending the liquid and solid propellant ingredients with an inert diluent liquid selected from the group consisting of methylene chloride, heptane, 2—2 dimethyl butane, 1—1 dichloroethane and n-hexane; (b) freezing the blended mix and granulating the same to form propellant granules; (c) removing the diluent by freeze drying said granules under vacuum conditions; (d) loading said diluent-free granules into a mold under vacuum conditions to effect the consolidation and curing of said granules to produce a high solids loaded solid rocket propellant characterized by having a solids load in excess of 90 percent.

4,177,228

METHOD OF PRODUCTION OF A MICRO-POROUS MEMBRANE FOR FILTRATION PLANTS

Ludwig Prölss, Bellach, Switzerland, assignor to Kilcher-Chemie AG, Recherswil, Switzerland

Filed Jun. 23, 1978, Ser. No. 918,584
Claims priority, application Switzerland, Jul. 15, 1977, 8765/77
Int. Cl.[2] B29D *27/04*
U.S. Cl. 264—24 **15 Claims**



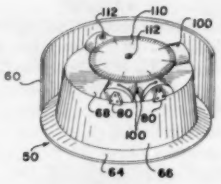
1. A method for production of a micro-porous membrane comprising the steps of:
mixing a quantity of finely divided particulate material into a fluid, membrane-forming polymer material; said particulate material being insoluble in said polymer material;
forming the particle-containing fluid polymer material into a thin layer and aligning the particles in said layer substantially normal to the surface of said layer while said polymer material is in the fluid state;
solidifying said layer containing the aligned particles to form an aligned particle containing membrane; and
extracting particles from the aligned particle containing membrane without destroying the membrane to produce a micro-porous membrane having aligned pores substantially normal to the surface of the membrane.

4,177,229

METHOD FOR PRODUCTION OF PRECAST MANHOLE BASES

Wayne O. Moore, P.O. Box 961, Mt. Vernon, Ill. 62864

Division of Ser. No. 790,547, Apr. 25, 1977, Pat. No. 4,103,862.
This application Mar. 16, 1978, Ser. No. 887,007
Int. Cl.[2] B28B *7/04*
U.S. Cl. 264—40.5 **3 Claims**



1. In a method for producing precast concrete manhole bases wherein a mold jacket is positioned in surrounding relationship relative to a mold form, said form defining a base extending to the interior face of said jacket and a central portion extending upwardly from said base in inwardly spaced relationship with said interior face of said jacket, the central portion having a top surface for supporting channel forming members, and wherein concrete is poured over said mold form for solidification of the concrete between the mold form and the jacket and over the mold form, the improvement comprising the steps of locating a first channel forming member on said top surface, said first channel forming member consisting of a central section and a radially extending section, and at least one additional member on said top surface extending radially outwardly from said central section, said central section of said first member defining a curved outer surface and the inner end of said additional member defining a mating curved surface, fixing said first member in position, positioning a protractor on said first mem-

ber and fixing the position of the protractor, providing reference points on said additional member, moving said additional member over said top surface, holding said inner end against said central section during movement of said additional member over said top surface, said mating surface and end providing accurate positioning of said additional member relative to said first member, measuring the angular relationship between said first member and said additional member by means of said protractor, and locking said additional member to said top surface when a desired angular relationship is achieved.

4,177,230

PROCESS FOR PRODUCING REACTION SINTERED SILICON NITRIDE OF INCREASED DENSITY

Khodabakhsh S. Mazdiyasni, Xenia, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jun. 2, 1978, Ser. No. 911,746

Int. Cl.[2] C04B *35/56, 35/58;* C01B *21/06*

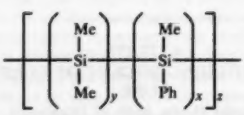
U.S. Cl. 264—60 **3 Claims**

1. A process for treating a porous reaction sintered silicon nitride body containing a trace amount of silicon oxynitride so as to increase its density and improve its room temperature strength, said process comprising the steps of:

(a) heating the silicon nitride body and an organosilicon compound under a vacuum to a temperature in the range of about 250° to 300° C. over a period of about 15 to 30 minutes, said organosilicon compound being a silazane having the following formula:

$$[(C_6H_5)_2SiNH]_3$$

or a polysilane having the following formula:



wherein the ratio of x to y ranges from 1:4 to 1:20, z ranges from about 1 to 100, Me is methyl, and Ph is phenyl;

(b) continuing the heating at a temperature in the range of about 250° to 300° C. for a period of about 4 to 6 hours, the heating being conducted in a nitrogen atmosphere when the organosilicon compound is silazane and in an argon atmosphere when the organosilicon compound is a polysilane;

(c) heating the resulting silicon nitride body infiltrated with the organosilicon compound to a temperature of about 1300° to 1400° C. over a period of 5 to 7 hours, the heating being conducted in a nitrogen atmosphere when the organosilicon compound is silazane and in an argon atmosphere when the organosilicon compound is a polysilane;

(d) continuing the heating at the temperature in the range of about 1300° to 1400° C. for about 0.5 to 2 hours, the organosilicon compound being thereby decomposed in pores of the silicon nitride body to α-Si_3N_4 when the compound is the silazane and to β-SiC when the compound is the polysilane; and

(e) allowing the infiltrated silicon nitride body substantially free of silicon oxynitride to cool to room temperature.

4,177,231

PROCESS FOR IMPROVING THE SLIDING PROPERTIES OF LINEAR POLYESTER MATERIAL IN SPINNING OPERATIONS

Rolf Kleber, Neu-Isenburg, and Ulrich Cuntze, Hofheim am Taunus, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Mar. 7, 1978, Ser. No. 884,363

Claims priority, application Fed. Rep. of Germany, Mar. 11, 1977, 2710640

Int. Cl.[2] B29H *21/04*

U.S. Cl. 264—130 **2 Claims**

1. Process for improving the sliding properties of linear polyester material in spinning operations, which comprises treating this material after the drawing with a mixture containing the following components:

(a) 50 to 90% by weight, preferably 60 to 80%, of a condensation product of the general formula I

$$R_1-\overset{\overset{O}{\|}}{C}-O-(C_2H_4O)_x-(C_3H_6O)_y-(C_2H_4O)_z-H \qquad (I)$$

in which R_1 is C_{10}–C_{22} alkyl or alkenyl, preferably C_{18}, y is a number of from 20 to 40, preferably from 25 to 35 and x plus z have a weight of less than 20% by weight of the polypropylene oxide portion, and

(b) 50 to 10% by weight, preferably 40 to 20%, of a compound of formulae II and/or III

$$R_2-\overset{\overset{O}{\|}}{C}-O-(C_2H_4O)_x-H \qquad (II)$$

and/or

$$R_3-O-(C_2H_4O)_y-H \qquad (III)$$

in which R_2 and R_3 are C_8–C_{18}alkyl or alkenyl, and x and/or y are numbers of from 5 to 20.

4,177,232

COATING UNCURED CEMENTITIOUS SURFACES

Henry Day, Sydney, Australia, assignor to Concrete Industries (Monier) Limited, Chatswood, Australia

Filed Jul. 5, 1977, Ser. No. 812,970

Claims priority, application Australia, Jul. 5, 1976, PC6533; Oct. 20, 1976, PC7799

Int. Cl.[2] C04B *41/04*

U.S. Cl. 264—133 **13 Claims**

1. A method of making a concrete tile comprising the steps forming the body of the tile by casting, extruding or drawing, applying a cementitious slurry to the surface of said body and, before the slurry layer has cured, applying to said layer an aqueous emulsion of a film-forming polymeric material; characterized in that the body of the tile is formed with a moisture content of less than 8%.

4,177,233

METHOD FOR FORMING SIDE-WALL STRIP IN A TUBE

Durward T. Roberts, Jr., Fairlawn, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Apr. 25, 1978, Ser. No. 899,954

Int. Cl.[2] B29H *17/00;* B29C *5/04, 9/00*

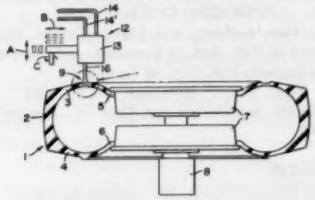
U.S. Cl. 264—134 **8 Claims**

1. The method of manufacturing a tire which comprises

providing a tire with a sidewall having a circumferential groove therein,

mounting said tire with said groove lying in a substantially horizontal plane and, while rotating said tire,

applying a major portion of a fluid stream of elastomer into the corners of said groove,



and positively directing lateral portions of the stream against the side surfaces of said groove, forming a strip in said sidewall having a concave meniscus.

4,177,234

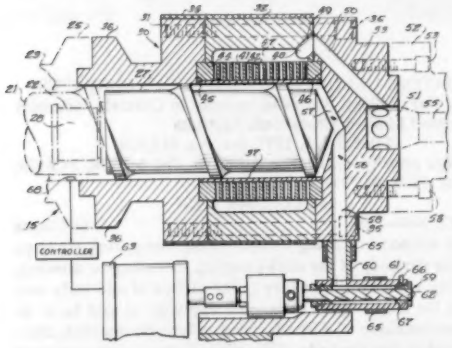
METHOD AND APPARATUS FOR CLEANING THERMOPLASTIC MATERIALS

George W. Lowry, Ashley, Ind., assignor to Metals & Plastics, Inc., Ashley-Hudson, Ind.

Filed Oct. 5, 1977, Ser. No. 839,444

Int. Cl.[2] B29B *1/03*; B29C *29/00*; B29F *3/06*

U.S. Cl. 264—140 **11 Claims**



1. A method of cleaning contaminated thermoplastic material comprising the steps of heating thermoplastic material containing small pieces of contaminants to a temperature such that the thermoplastic material is melted but contaminants are not melted, extruding the heated material to provide a confined stream of material under pressure, filtering a portion of said stream to provide a filtrate composed of melted thermoplastic material containing ummelted contaminants having a size smaller than a preselected size and controlling the flow rate of the remainder portion of said stream to maintain said stream under pressure where it is being filtered whereby most of said stream is caused to flow in said filtrate and said remainder of said stream carries away contaminants separated by said filtering step, said controlling of flow rate step including chilling the remainder portion to reduce the speed of its flow and removing the chilled material at a controlled rate.

4,177,235

METHOD OF MANUFACTURING ELECTRICALLY FUSED CORUNDUM

Manfred Neidhardt, Siegburg, and Gerhard Rehfeld, Aachen, both of Fed. Rep. of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Fed. Rep. of Germany

Filed Dec. 14, 1977, Ser. No. 860,525

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1976, 2658124

Int. Cl.[2] C04B *35/10*

U.S. Cl. 264—140 **13 Claims**

1. A method for preparing an α-corundum composition having an α-corundum content of at least 99.95 weight percent from an alumina containing at least one impurity of the group consisting of TiO_2, Fe_2O_3, CaO and MgO which comprises heating said alumina which has an alkali content of between 0.05 and 0.60 weight percent and an Al_2O_3 content of more than 95 weight percent with SiO_2 in an electric arc furnace at a temperature sufficient to form a melt thereof, cooling said melt whereby to form a composition comprising an α-corundum phase in a siliceous matrix and thereafter separating said siliceous matrix from said α-corundum phase.

4,177,236

PROCESS FOR PRODUCING REGENERATED CELLULOSE CONTAINING CROSS LINKED SODIUM LIGNATE OR SODIUM LIGNOSULFONATE

Neal E. Franks, Suffern, N.Y., assignor to Akzona Inc., Asheville, N.C.

Continuation-in-part of Ser. No. 706,995, Jul. 20, 1976, abandoned. This application Mar. 17, 1978, Ser. No. 887,793

Int. Cl.[2] D01F *2/00*

U.S. Cl. 264—187 **6 Claims**

1. A method of making a shaped regenerated cellulose article which comprises mixing an extrudable viscose solution with about 1 to 40% by weight of a water insoluble polymer selected from the group of sodium lignate cross linked with at least about 3.8% by weight of formaldehyde or sodium lignosulfonate cross linked with at least about 10% by weight of formaldehyde, an aliphatic ether thereof, or mixtures thereof wherein said sodium lignate of sodium lignosulfonate contains not more than about 5% sulfur and spinning the resulting mixture.

4,177,237

METHOD OF MOLDING SOCKET OF PLASTIC RESIN TUBE

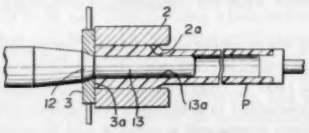
Yoshio Ueno; Takeshi Ikeda, both of Hiratsuka, and Masaru Isozaki, Kanagawa, all of Japan, assignors to Mitsubishi Plastics Industries Limited, Tokyo, Japan

Filed Aug. 24, 1977, Ser. No. 827,260

Claims priority, application Japan, Nov. 24, 1976, 51-141034

Int. Cl.[2] B29D *23/00*

U.S. Cl. 264—296 **4 Claims**



1. A method for molding a socket end for a plastic tube comprising the steps of:

heating the end of a resin tube to soften it;

fitting said end axially upon the small diameter part of a male mold having a small diameter part, a tapered part and a large diameter part;

surrounding said small diameter part of said male mold with a female mold consisting of a barrel having an inner sur-

face spaced from the small diameter part by a distance greater than the thickness of the resin tube, and a stopper having an edge perpendicular to the axis of the resin tube which contacts the small diameter part of the male mold adjacent the boundary between the small diameter part and the tapered part;

pushing the resin tube in the direction of said male mold large diameter part so that said resin tube abuts the perpendicular wall of said stopper and fills said space so as to form a thickened end portion having an edge perpendicular to the axis of the resin tube;

removing said female mold from about said male mold; and

pushing the resin tube in the direction of said male mold larger diameter part whereby the end of the resin tube having increased thickness is forced to expand and be fitted about said larger diameter part so as to form a socket end having a perpendicular edge and a thickness at least equal to that of the remainder of the resin tube.

4,177,238

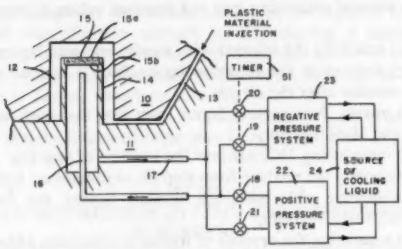
FLUID COOLING OF INJECTION MOLDED PLASTIC ARTICLES

Paul E. Allen, Newtown, Conn., assignor to Logic Devices, Inc., Bethel, Conn.

Filed Dec. 14, 1977, Ser. No. 860,370

Int. Cl.[2] B29C *5/00*; B29F *1/00*

U.S. Cl. 264—328 **12 Claims**



1. A method for cooling a plastic article that is formed by the injection of plastic material into a mold cavity formed by mold dies which have a cooling passageway adjacent at least a portion of the mold cavity comprising the steps or providing a fluid permeable porous plug communicating between the cavity and the passageway, injecting plastic material into the cavity, supplying a cooling liquid in the passageway that has a normal less than atmospheric pressure at the plug and altering the cooling liquid pressure at the plug to a greater than atmospheric pressure to change the direction of the flow of cooling fluid in the plug between the cavity and the cooling passageway.

4,177,239

BLOW MOLDING METHOD

Franz Gittner, Soltendieck; Arnaldo Glüser, Bodenteich, and Klaus D. Kötke, Lüder, Reinstorf, all of Fed. Rep. of Germany, assignors to Bekum Maschinenfabriken GmbH, Berlin, Fed. Rep. of Germany

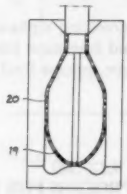
Filed Apr. 6, 1978, Ser. No. 893,833

Claims priority, application Fed. Rep. of Germany, Apr. 20, 1977, 2717365

Int. Cl.[2] B29C *17/07*

U.S. Cl. 264—530 **11 Claims**

1. In a method of transforming a hollow thermoplastic preform which is closed at one end and open at the other end into a hollow shaped article, which method comprises the steps of introducing a blow tube into the open end of the pre-form and confining the pre-form in the cavity of a blow mold wherein the cavity is bounded by a bottom surface which is remote from the open end of the pre-form in the mold, a peripheral surface which surrounds the major portion of the pre-form in the mold between the open end of the pre-form and close to the bottom surface and an intermediate surface between the peripheral and bottom surfaces; mechanically stretching the pre-form in the mold; admitting into the pre-form a blowing fluid at a first pressure via the blow tube in the course of said stretching step; and admitting into the pre-form a blowing fluid



at a higher second pressure upon at least substantial completion of said stretching step, the improvement which consists in maintaining said first pressure at a level at which said major portion of the pre-form in the mold is expanded into contact with the peripheral surface and in such selection of said second pressure as to effect abrupt biaxial pneumatic expansion of the remaining portion of the pre-form against the intermediate and bottom surfaces of the mold.

4,177,240

TUBULAR REACTOR FOR THE HIGH PRESSURE POLYMERIZATION OF ALPHA-OLEFINES

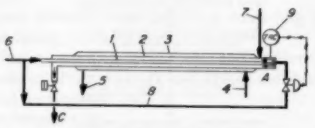
Alberto Dal Bianco, Ferrara, Italy, assignor to Montedison S.p.A., Milan, Italy

Filed Jul. 8, 1977, Ser. No. 814,169

Claims priority, application Italy, Jul. 12, 1976, 25228 A/76

Int. Cl.[2] B01J *3/04*

U.S. Cl. 422—115 **6 Claims**



1. A tubular high thermal exchange reactor for the catalyzed production of alpha-olefine polymers and copolymers thereof from process fluid alpha-olefines under high pressure, which comprises three coaxially-arranged spaced-apart tubes consisting of:

(1) innermost tube means comprising a tube having an inlet opening at one end for the entry of said alpha-olefine process fluid and an outlet opening at the other end for the emission of said alpha-olefine process fluid, said innermost tube having perforations in the walls thereof in open communication with

(2) intermediate tube means comprising a tubular wall and an upstream end wall and a downstream end wall with an opening therein for said innermost tube, said tube and said end walls encompassing the entire perforated area of said innermost tube, the walls of said intermediate tube being adapted to withstand high reaction pressures and which define an annular interspace with the walls of said innermost tube for the passage therethrough of said alpha-olefine process fluid, said outlet opening of said innermost tube terminating adjacent but spaced apart from the upstream end wall of said intermediate tube thereby forming the inlet means of said intermediate tube for receiving said alpha-olefine process fluid directly from said outlet opening of said innermost tube and having separate inlet means

for entry of a polymerization catalyst for said alpha-olefine near the inlet means for said alpha-olefine process fluid and an outlet opening for alpha-olefine polymer or copolymer fluid at said downstream end wall,

(3) heat exchange means comprised of an outermost tube having a tubular wall and end walls, the walls defining an annular interspace with the walls of said intermediate tube means for the passage therethrough of a refrigerating fluid, and

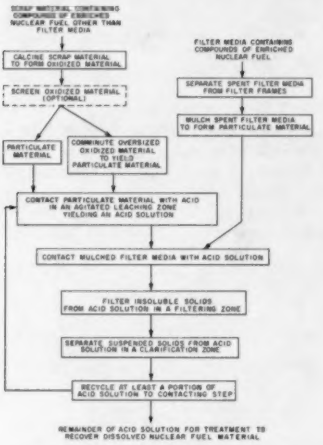
(4) conduit means for diverting alpha-olefine process fluid externally between said innermost tube process fluid inlet and said innermost tube process fluid outlet.

4,177,241

APPARATUS AND PROCESS FOR RECOVERING NUCLEAR FUEL FROM SCRAP MATERIAL

Larry A. Divins, and Larry E. Short, both of Wilmington, N.C., assignors to General Electric Company, San Jose, Calif.

Filed Sep. 8, 1977, Ser. No. 831,689
Int. Cl.[2] G21F *9/30*
U.S. Cl. 423—20 **11 Claims**


SCRAP MATERIAL CONTAINING COMPOUNDS OF ENRICHED NUCLEAR FUEL OTHER THAN FILTER MEDIA
CALCINE SCRAP MATERIAL TO FORM OXIDIZED MATERIAL
SCREEN OXIDIZED MATERIAL (OPTIONAL)
PARTICULATE MATERIAL
COMMINUTE OVERSIZED OXIDIZED MATERIAL TO YIELD PARTICULATE MATERIAL
FILTER MEDIA CONTAINING COMPOUNDS OF ENRICHED NUCLEAR FUEL
SEPARATE SPENT FILTER MEDIA FROM FILTER FRAMES
MULCH SPENT FILTER MEDIA TO FORM PARTICULATE MATERIAL
CONTACT PARTICULATE MATERIAL WITH ACID IN AN AGITATED LEACHING ZONE YIELDING AN ACID SOLUTION
CONTACT MULCHED FILTER MEDIA WITH ACID SOLUTION
FILTER INSOLUBLE SOLIDS FROM ACID SOLUTION IN A FILTERING ZONE
SEPARATE SUSPENDED SOLIDS FROM ACID SOLUTION IN A CLARIFICATION ZONE
RECYCLE AT LEAST A PORTION OF ACID SOLUTION TO CONTACTING STEP
REMAINDER OF ACID SOLUTION FOR TREATMENT TO RECOVER DISSOLVED NUCLEAR FUEL MATERIAL

1. A process for recovering in solution form enriched nuclear fuel compounds from scrap materials, said process comprising the steps of:

(a) calcining the scrap material that is readily combustible to yield an oxidized material;

(b) comminuting the oxidized material to form a particulate material of particle size less than about 250 microns;

(c) contacting the particulate material with an acid containing some recycled acid from step (g) in a mechanically agitated leaching zone of a slab-shaped nuclear-safe configuration to dissolve said compounds and yield an acid solution of said compounds;

(d) mulching non-combustible material such as filter media so that it is in the form of particulate material;

(e) contacting the mulched non-combustible material with the acid solution of (c);

(f) filtering the nonsuspended insoluble solids from the acid solution in a filtering zone;

(g) separating the suspended solids from the acid solution in a clarification zone;

(h) recycling at least a portion of the acid solution of (g) from the clarification zone to the leaching zone; and

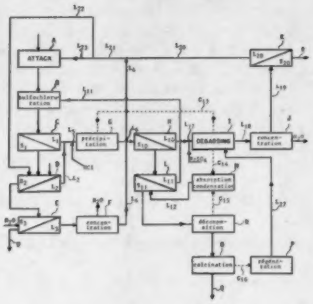
(i) collecting the remainder of the acid solution for subsequent treatment.

4,177,242

METHOD OF OBTAINING PURE ALUMINA BY ACID ATTACK ON ALUMINOUS MINERALS CONTAINING OTHER ELEMENTS

Joseph Cohen, and Alain Adjemian, both of Aix en Provence, France, assignors to Aluminum Pechiney, Lyon, France

Filed Feb. 9, 1978, Ser. No. 876,205
Claims priority, application France, Feb. 28, 1977, 77 06531
Int. Cl.[2] C01F *7/20*; C01G *15/00*; C22B *21/00*
U.S. Cl. 423—83 **17 Claims**



1. A method of obtaining alumina of high purity from aluminous mineral containing iron and titanium values as impurities by

(a_1) attacking the mineral with a sulphuric acid liquor,

(a_2) separating the resulting liquor from a residue which remains after the attack,

(a) mixing the resulting liquor from step (a_2) with an HCl and H_2SO_4 liquor,

(b) introducing HCl gas into the mixture of step (a),

(c) cooling the mixture from step (b) to precipitate hydrated aluminum chlorosulphate crystals having the formula $AlSO_4Cl.6\text{–}7H_2O$,

(d) separating the crystals of hydrated aluminum chlorosulphate from the liquor,

(e) heating the crystals separated in step (d) to a temperature within the range of 300° C. to a temperature that does not exceed 600° C. to yield a mixture of aluminum sulphates and hydrochloric gases,

(f) thermally decomposing the aluminum sulphates from step (e) to yield alumina of high purity and sulphuric gases SO_2 and SO_3,

(g) degassing the liquor of step (d) to yield HCl gas,

(h) concentrating the degassed liquor from step (g), and

(j) recycling the concentrated liquor from step (h) to the attack on the aluminous mineral.

4,177,243

PROCESS FOR PRODUCTION OF PHOSPHATE ROCK SLURRIES HAVING REDUCED WATER CONTENT AND VISCOSITY

Joel Schwartz, Ringwood, and Joseph P. Fleming, East Brunswick, both of N.J., assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Mar. 1, 1976, Ser. No. 662,877
Int. Cl.[2] C01B *25/22*
U.S. Cl. 423—167 **8 Claims**

1. A process for producing an aqueous slurry of ground phosphate rock for use in phosphoric acid manufacture, the process comprising admixing with the slurry, an effective amount of sodium naphthaleneformaldehyde sulfonate to obtain a pumpable slurry having reduced moisture content or reduced viscosity so that the slurry is pumpable during use in phosphoric acid manufacture.

4,177,244
PROCESS FOR PURGE STREAM TREATMENT IN REMOVAL OF SULFUR DIOXIDE

Ullrich Neumann, Kiefernweg, 5038 Rodenkirchen, and Kurt Rudolph, Benfleetstr. 16, 5000 Cologne 40, both of Fed. Rep. of Germany

Continuation of Ser. No. 818,722, Jul. 25, 1977, abandoned. This application Aug. 3, 1977, Ser. No. 821,481

Claims priority, application Fed. Rep. of Germany, Jul. 24, 1976, 2633423

Int. Cl.[2] C01B *17/00, 17/45*

U.S. Cl. 423—242 **11 Claims**

1. In the process for removing sulfur dioxide from a gas whereby sulfur dioxide is absorbed by an aqueous sodium sulfite-containing absorbing solution to thereby form a sodium bisulfite-enriched solution, which bisulfite-enriched solution is subsequently thermally decomposed to evaporate sulfur dioxide and water therefrom, thereby forming an aqueous slurry comprising solid sodium sulfite and a mother liquor containing dissolved salts including sodium sulfite, sodium pyrosulfite, sodium sulfate and dissolved impurities selected from the group consisting of sodium thiosulfate, sodium chloride and selenium, the improvement which comprises:

a. mixing at least a portion of said mother liquor with a neutralizing agent selected from sodium hydroxide, sodium carbonate or both;

b. cooling the resulting neutralization mixture to crystallize sodium sulfite hydrate therefrom;

c. separating said crystallized sodium sulfite hydrate from said neutralization mixture thereby leaving a residual liquor containing the dissolved impurities;

d. recycling said separated sodium sulfite hydrate to the sulfur dioxide absorbing solution; and

e. discarding at least a portion of said residual liquor in order to remove dissolved impurities from the process.

4,177,245
SCALE SUPPRESSION IN LIME AND LIMESTONE SCRUBBERS

Harvey S. Rosenberg, Columbus, and Henry M. Grotta, Delaware, both of Ohio, assignors to Battelle Development Corporation, Columbus, Ohio

Filed May 24, 1978, Ser. No. 908,806

Int. Cl.[2] C01B *17/00;* **B01D** *5/00;* **C09K** *15/00*

U.S. Cl. 423—242 **7 Claims**

1. In a method for reducing calcium sulfate scale formation in a known lime or limestone wet scrubbing process for flue gas desulfurization wherein SO_2-laden flue gas is exposed to the lime or limestone and the SO_2 is absorbed therein for removal, wherein the improvement comprises

adding to the flue gas, prior to the absorption step, an oxidation inhibitor comprising gaseous NO.

4,177,246
WET OXIDATION OF MATERIALS

Xerxes T. Stoddard, 4617 W. 27th Ave., Denver, Colo. 80212; Vesper A. Vaseen, 9840 W. 35th Ave., Wheatridge, Colo. 80033, and Ruel C. Terry, 3090 S. High St., Denver, Colo. 80210

Filed Feb. 24, 1978, Ser. No. 881,012

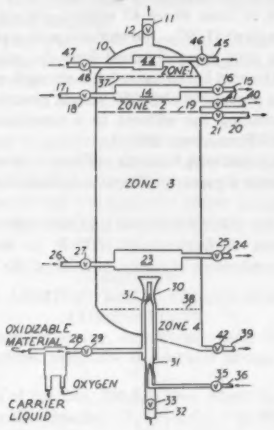
Int. Cl.[2] C22B *26/10;* **C01B** *31/20;* **D21C** *11/12*

U.S. Cl. 423—437 **3 Claims**

1. A method of wet oxidizing cellulose into ash residue comprising the steps of

establishing a reaction zone, the said reaction zone being maintained both within the range of temperatures between 100° F. and 610° F. and within the range of pressures between 30 psia and 3200 psia,

injecting into the said reaction zone a slurry composed of cellulose suspended in a liquid, the said liquid being inert and having the capability of taking oxygen into solution and being selected from a group of fluorocarbons containing eight or more carbon atoms,



injecting oxygen into the said slurry, and

wet oxidizing the said cellulose into residue.

4,177,247
PROCESS FOR PRODUCING DITHIONITES

Eiichi Yonemitsu; Hiroshi Miyamori, both of Kashiwa; Takanari Nawata, Tokyo; Tomio Fujioka, Matsudo; Akira Ito, and Makoto Kobayashi, both of Tokyo, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed May 8, 1978, Ser. No. 903,496

Claims priority, application Japan, May 17, 1977, 52-56934

Int. Cl.[2] C01B *17/66*

U.S. Cl. 423—515 **47 Claims**

1. A process for preparing a dithionite, which process comprises reacting

(A) a member selected from the group consisting of (1) and (2), these being

(1) bisulfite, pyrosulfite, alkylsulfite, and arylsulfite salts of elements of Groups Ia, IIa and IIb of the Periodic Table, and ammonium, and

(2) a combination of

(i) substances capable of producing the salts as mentioned in 1) above by reaction with sulfur dioxide or sulfurous acid, and

(ii) sulfur dioxide or sulfurous acid, with

(B) a hydroquinone.

4,177,248
PRODUCTION OF SULFUR DIOXIDE FROM WASTE SULFURIC ACID

Wilfred T. Richard, Houston, Tex., assignor to Stauffer Chemical Company, Westport, Conn.

Continuation of Ser. No. 706,401, Jul. 19, 1976, abandoned, which is a continuation of Ser. No. 656,766, Feb. 9, 1976, abandoned, which is a continuation of Ser. No. 568,958, Apr. 17, 1975, abandoned, which is a continuation of Ser. No. 438,091, Jan. 30, 1974, abandoned. This application Dec. 12, 1977, Ser. No. 860,035

Int. Cl.[2] C01B *17/50, 17/52, 17/72*

U.S. Cl. 423—540 **2 Claims**

1. A process for the production of SO_2 gas suitable for use in producing H_2SO_4 comprising the steps of:

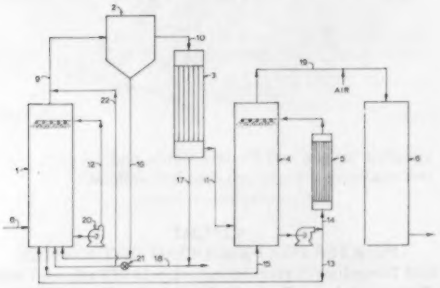
(a) heating spent sulfuric acid containing 25 weight percent to 92 weight percent of H_2SO_4 in a furnace at a temperature of from 1600° F. to 2300° F. to produce a gaseous effluent of sulfur dioxide, water vapor and gaseous products;

(b) passing the effluent to a waste heat boiler to remove heat;

(c) contacting the gaseous effluent from the waste heat boiler in a scrubbing zone with sulfuric acid maintained at a strength of from about 45 weight percent to about 65 weight percent H_2SO_4, the sulfuric acid make-up for the scrubbing zone being obtained from the pre-drying zone wherein the acid is maintained at a strength of from about 40 weight percent to about 60 weight percent H_2SO_4 and thereby cooling the effluent to a temperature of from about 150° F. to about 260° F.;

(d) removing acid mist from the effluent from the scrubbing zone to form a gaseous effluent essentially free of H_2SO_4 and SO_3;

(e) cooling the effluent from the acid mist removal zone to a temperature of from about 100° F. to about 130° F. thereby condensing at least a portion of the water vapor



remaining in the effluent, said condensed water vapor being virtually free of sulfuric acid;

(f) contacting the gaseous effluent from the condensation zone in a pre-drying zone with sulfuric acid of from about 45 weight percent to about 65 weight percent H_2SO_4 obtained from the scrubbing zone thereby stripping moisture from said gaseous effluent while maintaining the concentration of sulfuric acid in the pre-drying zone at from about 40 weight percent to about 60 weight percent H_2SO_4 while any excess pre-drying zone sulfuric acid is transferred to the scrubbing zone as makeup for the scrubbing zone sulfuric acid; and

(g) contacting the effluent from the pre-drying zone with sulfuric acid having a concentration of from about 93% to 98% H_2SO_4 in a final drying zone to produce a dry effluent gas containing SO_2 for use in the production of H_2SO_4.

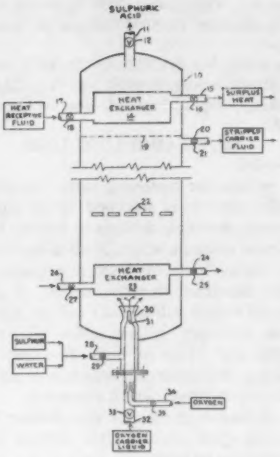
4,177,249

WET OXIDATION OF SULPHUR AND THE CAPTURE OF GENERATED HEAT

Xerxes T. Stoddard, 4617 W. 27th Ave., Denver, Colo. 80212; Vesper A. Vaseen, 9840 W. 35th Ave., Wheatridge, Colo. 80033, and Ruel C. Terry, 3090 S. High St., Denver, Colo. 80210

Filed Sep. 12, 1977, Ser. No. 832,635
Int. Cl.[2] C01B *17/72*
U.S. Cl. 423—522 **6 Claims**

1. In a method for the production of sulphuric acid which comprises reacting elemental sulphur with oxygen dissolved in an inert liquid at temperatures between 250° F. and 750° F. and pressures between 30 psia and 3200 psia in the presence of water to form sulphuric acid, the improvement which comprises using as said inert liquid a compound selected from the group consisting of trifluorocarbon amines, cyclic fluorocarbon oxides and perfluorocarbons, each such compound having eight or more carbon atoms.

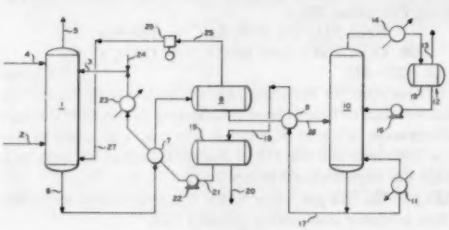


4,177,250

METHOD OF REMOVING ACETYLENE AND SULFUR COMPOUNDS FROM GASES BY ABSORPTION IN DIMETHYL FORMAMIDE

Howard B. Irvin; Fred T. Sherk, and Alfred A. Hoffman, Jr., all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 714,934, Aug. 16, 1976, Pat. No. 4,086,288.
This application Oct. 18, 1977, Ser. No. 843,198
Int. Cl.[2] B01D *53/34*; C01B *17/04*
U.S. Cl. 423—573 G **8 Claims**



1. A process for the simultaneous desulfurization of and acetylene removal from a gas which process comprises

contacting a gas stream comprising an olefin and oxygen, and, as contaminants, acetylenes and at least one oxidizable sulfur compound selected from the group consisting of H_2S, COS, and CS_2, in an absorption zone with liquid dimethyl formamide such as to produce a gaseous effluent comprising the olefin and being essentially acetylene-free and a liquid effluent comprising dimethyl formamide, acetylenes, and sulfur,

introducing a liquid hydrocarbon selected from the group consisting of paraffinic hydrocarbons having 4–8 carbon atoms per molecule, containing at least one tertiary carbon atom per molecule, and aromatic hydrocarbons having 6–10 carbon atoms per molecule into the absorption zone at a location above the location of introduction of said dimethyl formamide, and

withdrawing a gaseous effluent stream from said absorption zone comprising said olefin and said hydrocarbon and

being essentially acetylene and sulfur-free and introducing at least a portion of said gaseous effluent into an alkylation zone and reacting said olefin and said hydrocarbon in the presence of an alkylation catalyst to form an alkylate in said alkylation zone.

4,177,251

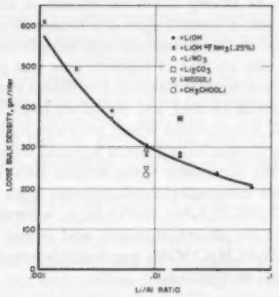
PRODUCTION OF LOW LOOSE BULK DENSITY ALUMINA

Larry L. Bendig, Ponca City; Donald E. Stowell, Oklahoma City, both of Okla., and Laura A. Starks, New Orleans, La., assignors to Conoco, Inc., Ponca City, Okla.

Filed Oct. 23, 1978, Ser. No. 954,042

Int. Cl.² C01F *7/02*

U.S. Cl. 423—628 **5 Claims**



1. A method for lowering loose bulk density of alumina obtained from the water hydrolysis of aluminum alkoxide comprising hydrolyzing said aluminum alkoxides by contacting with water containing lithium ions in a concentration of at least 0.06 percent by weight based on the weight of hydrolysis water to obtain alumina and alcohols, removing the alcohols, recovering aluminum trihydrate having a lithium ion content of from about 700 parts per million to about 15,000 parts per million when determined as a dry uncalcined powder and drying said aluminum trihydrate.

4,177,252

LOW TEMPERATURE SHIFT CONVERSION PROCESS

Godfrey C. Chinchen, Stockton-on-Tees, England, assignor to Imperial Chemical Industries Limited, London, England

Filed May 2, 1978, Ser. No. 902,109

Claims priority, application United Kingdom, May 9, 1977, 19379/77

Int. Cl.² C01B *1/02, 2/10*

U.S. Cl. 423—656 **10 Claims**

1. A process for producing hydrogen and carbon dioxide according to a low temperature shift reaction, said process comprising contacting a gaseous mixture containing carbon monoxide and steam with a fixed-bed of a copper-containing catalyst, wherein:

(a) said fixed-bed comprises an inlet zone where the reacting gas first encounters said catalyst and an outlet zone where gases subsequently encounter said catalyst;

(b) the outlet temperature is less than about 300° C; and

(c) the volume-to-surface area ratio of the catalyst pieces in the inlet zone is less than the volume-to-surface ratio of the catalyst pieces in the outlet zone,

whereby the inlet zone catalyst absorbs poisoning compounds at high effectiveness and decreases poisoning of the outlet zone catalyst.

4,177,253

MAGNETIC PARTICLES FOR IMMUNOASSAY

George E. Davies, Macclesfield, England, and Jiri Janata, Salt Lake City, Utah, assignors to Imperial Chemical Industries Limited, United Kingdom

Filed Jul. 6, 1977, Ser. No. 813,422

Claims priority, application United Kingdom, Jul. 30, 1976, 31839/76

Int. Cl.² G01N *33/00*

U.S. Cl. 424—1 **25 Claims**

1. Composite magnetic particles each particle comprising a core having a density of less than 1.5 gm/cc, at least a proportion of the surface of the core being coated with a coating of magnetic material and a biologically active component on the surface of the core and/or the said coating.

4,177,254

ORALLY ADMINISTRABLE PHARMACEUTICAL COMPOSITION

Karrar A. Khan, Worthing, and Brian Cook, Goring-by-Sea, both of England, assignors to Beecham Group Limited, England

Continuation of Ser. No. 750,609, Dec. 15, 1975, abandoned. This application Jul. 13, 1978, Ser. No. 923,933

Claims priority, application United Kingdom, Jan. 2, 1976, 00023/76

Int. Cl.² A61K *9/16, 9/36, 31/43*

U.S. Cl. 424—16 **15 Claims**

1. A process for the preparation of water-soluble or water-dispersible granules of water-insoluble penicillins, said granules being reconstitutable to syrup form, which comprises coating particulate sugar, mannitol or sorbitol with a suspension of the water-insoluble penicillin in a sucrose solution binder, and drying the resultant particles or agglomerates of particles, the process being carried out by fluid bed granulation using water as solvent for the binder.

4,177,255

RUMEN-STABLE PELLETS

Clarence C. Dannelly, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 2, 1977, Ser. No. 830,279

Int. Cl.² A61K *9/24, 9/32, 9/36*

U.S. Cl. 424—21 **7 Claims**

1. A pellet adapted for oral administration to a ruminant comprising a core material beneficial to the ruminant postruminally, and a coating surrounding said core material which protects the core material in the rumen and releases it in the abomasum, said coating comprising

(a) a physiologically acceptable polymeric matrix insoluble in the environment of the rumen and abomasum consisting essentially of at least one polymer, copolymer, or blend of polymers or copolymers selected from the group consisting of cellulose esters, poly(vinylchloride), copolymers of vinylidene chloride, polystyrene, poly(methyl methacrylate), poly(dimethylsiloxane), polyesters made from dicarboxylic acids having from 8 to 22 carbon atoms and glycols having from 4 to 16 carbon atoms, polyamides from amino acids having from 8 to 22 carbon atoms or from dicarboxylic acids having from 8 to 22 carbon atoms condensed with diamines having from 4 to 16 carbon atoms, and polymethacrylates having silicone or fluorine substituted alcohol moieties of from 2 to 8 carbon atoms, and

(b) a substance dispersed in said polymeric material which is stable in the environment of the rumen, but which leaches from said matrix below pH of about 4 in the environment of the abomasum thereby allowing said polymeric matrix to lose its integrity and release the core material,

said coating comprising from about 35% to about 65% by volume of said dispersed substance, and said coating having a sticking temperature of at least about 50° C.

4,177,256

OSMOTIC BURSTING DRUG DELIVERY DEVICE

Alan S. Michaels, San Francisco, Calif., and Mark S. Guillod, Kaneohe, Hi., assignors to ALZA Corporation, Palo Alto, Calif.

Continuation-in-part of Ser. No. 578,979, May 19, 1975, abandoned, which is a continuation-in-part of Ser. No. 465,276, Apr. 29, 1974, abandoned, which is a continuation-in-part of Ser. No. 354,359, Apr. 25, 1973, abandoned. This application Nov. 29, 1977, Ser. No. 855,605

Int. Cl.[2] A61K *9/22, 9/26, 9/52, 9/54*

U.S. Cl. 424—22 **12 Claims**

1. A drug delivery device for administering drug continuously to an aqueous body environment for a prolonged time period at a controlled rate, said device being in the form of a solid, unit body that:

(a) is sized and shaped for placement in the environment; and

(b) consists essentially of a mixture that defines a surface of predetermined area that is exposed to the water in said environment, said mixture consisting essentially of

(i) about 1% to about 50% by volume, of discrete depots 0.1 to 250 microns, surface area average diameter, in size of a drug composition that is an osmotically effective solute, said depots being dispered in

(ii) about 50% to about 99%, by volume, of a polymer such that the depots are surrounded substantially individually by a layer of the polymer, the polymer being substantially impermeable to the drug composition, insoluble in the environment at least during the prolonged time period, and permeable to water and having a tensile strength, Young's modulus, and a maximum elongation such that the cohesive strength of said layer is exceeded by the pressure that the depot the layer surrounds is able to generate by imbibing water, whereby when the device is placed in the environment, water is imbibed by the depots in a serially inwardly manner beginning with the depots nearest said surface and said pressure is generated therein, causing the polymer layers surrounding said depots to rupture thereby releasing drug composition therefrom to the environment.

4,177,257

CYCLIC SULPHUR COMPOUNDS

Harold F. Hodson, Hayes, and John F. Batchelor, Beckenham, both of England, assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

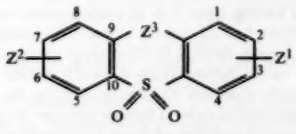
Division of Ser. No. 394,424, Sep. 5, 1973, Pat. No. 4,025,635. This application Mar. 11, 1977, Ser. No. 776,936

Claims priority, application United Kingdom, Sep. 6, 1972, 41429/72; May 4, 1973, 21174/73

Int. Cl.[2] A61K *9/14, 9/04, 31/41, 31/39*

U.S. Cl. 424—46 **26 Claims**

1. A method for the treatment or prophylaxis of an allergic condition of a mammal comprising administration to the mammal of a therapeutically or prophylactically effective anti-allergic dose of a tricyclic compound of formula I



(I)

wherein

Z^1 is a substituent in the 1-, 2-, 3-, or 4-position and is carboxyl, 5-tetrazolyl, 5-(1-alkyl)tetrazolyl, or 5-(2-alkyl)tetrazolyl in which the alkyl groups have 1 to 6 carbon atoms and are each optionally subsituted by a hydroxyl group;

Z^2 is hydrogen or a substituent in the 5-, 6-, 7-, or 8 -position selected from the values of the group Z^1 as defined above or is alkylsulphonyl, alkylsulphinyl, thioalkyl, amino, acylamino, nitro, cyano, halogen preferably chlorine or bromine, acyl, alkyl or alkoxy wherein the "alkyl" moiety of each of the acyl, alkyl, alkoxy, thioalkyl, acylamino, alkylsulphinyl and alkylsulphonyl groups has 1 to 6 carbon atoms; and

Z^3 represents a bond or is oxygen, sulphur, sulphoxide or methylene; provided that when Z^3 is oxygen Z^1 is carboxyl

together with pharmaceutically acceptable salt thereof.

4,177,258

DENTIFRICE FOR DENTAL REMINERALIZATION

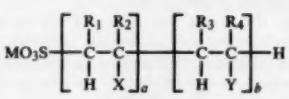
Maria C. S. Gaffar, and Abdul Gaffar, both of Somerset, N.J., assignors to Colgate Palmolive Company, New York, N.Y.

Continuation-in-part of Ser. No. 951,893, Oct. 13, 1978. This application Mar. 14, 1979, Ser. No. 20,377

Int. Cl.[2] A61K *7/18, 7/22*

U.S. Cl. 424—52 **15 Claims**

1. A remineralizing dentifrice comprising an aqueous humectant vehicle having dissolved therein at least 50 ppm of calcium ions and at least 50 ppm of a source of phosphate ions, the ratio of calcium to phosphate ions being from about 0.01 to about 100:1, the amount of calcium ions and phosphate ions being insufficient to precipitate and sufficient to effect remineralization of dental enamel; said dentifrice further comprising a gelling agent, a compound which provides fluoride anticaries agent and an antinucleating agent selected from the group of acids and orally acceptable water-soluble salts thereof consisting of: diamine tetramethylenephosphonic acids of the formula $(M_2O_3PH_2C)_2N(CH_2)_nN(CH_2PO_3M_2)_2$, wherein n is an integer from 1 to 10; phosphonoacetic acid or salt thereof of the formula $M_2O_3PCH_2COOM$; peroxydiphosphate of the formula $M_4P_2O_8$; an oligomer



in which M is hydrogen or an orally acceptable cation; R_1, R_2, R_3, and R_4 are independently hydrogen, methyl or ethyl; Y is at least one hydrophilic member of the group consisting of —COOM, $—CONH_2$ and CH_2OH; X is at least one hydrophobic member of the group consisting of —CN, —COOR, $—COOR_5OR$, —CONHR and $—COONHR_5COR$: R is C_{1-8} alkyl; R_5 is C_{1-4} alkylene; a is 0–7 and a+b is about 4–15; said dentifrice having a pH of about 5 to 9.

4,177,259

WATERPROOF MAKEUP AND METHOD OF PREPARING SAME

Graham Barker, Fair Lawn, and Martin J. Barabash, Montvale, both of N.J., assignors to Witco Chemical Corporation, New York, N.Y.

Filed Jul. 14, 1977, Ser. No. 815,477

Int. Cl.[2] A61K *7/021*

U.S. Cl. 424—63 **8 Claims**

1. A method of preparing a stable waterproof makeup having a water disperse phase and an oil continuous phase which comprises (A) admixing (a) a cosmetic emulsion oil and (b) a cosmetic pigment and (c) an emulsifier combination comprising (i) a stearate selected from the group consisting of aluminum stearate, calcium stearate and mixtures thereof, and (ii) a polyhydric alcohol ester of a liquid fatty acid having an HLB value less than 5 and selected from the group consisting of polyglycerol (4) monooleate, sorbitan sesquioleate and glycerol monooleate; and (B), while agitating, blending at 90° C.–95° C. therewith (d) water which has been heated to a temperature in the range of about 90° C. to about 95° C.

4,177,260

COSMETIC PREPARATIONS

Theodor Wajaroff, Darmstadt, Fed. Rep. of Germany, assignor to Wella Aktiengesellschaft, Darmstadt, Fed. Rep. of Germany

Filed Apr. 5, 1977, Ser. No. 784,662
Claims priority, application Fed. Rep. of Germany, Apr. 6, 1976, 2614723
Int. Cl.[2] A61K *7/09, 7/11, 7/155*
U.S. Cl. 424—71 9 Claims

1. A cosmetic composition for shaping hair comprising an aqueous preparation containing (a) 2–12 wt. % of a keratin softening agent selected from the group consisting of alkali, mercapto compounds, sulfites and sulfides and (b) a nitrogen-containing swelling and penetrating agent, wherein the improvement comprises that said swelling and penetrating agent is 0.5–30 wt. % of imidazolidinone-(2).

4,177,261

PHARMACEUTICAL COMPOSITION AND METHOD OF STIMULATING BLOOD CIRCULATION AND WOUND HEALING

Günther Dietze, and Matthias Wicklmayr, both of Munich, Fed. Rep. of Germany, assignors to Thera Gesellschaft für Patentverwertung mbH, Herrsching, Fed. Rep. of Germany

Filed Dec. 30, 1977, Ser. No. 865,912
Claims priority, application Fed. Rep. of Germany, Jan. 3, 1977, 2700043
Int. Cl.[2] A61K *35/14, 37/42*
U.S. Cl. 424—101 6 Claims

1. A pharmaceutical composition useful for improving and stimulating blood circulation and thereby improving the healing of wounds, said composition comprising (a) albumin-freed calf blood extract, and (b) from about 0.001 to about 2.5 micrograms of a kinin selected from the group consisting of Brady kinin and kallidin per milligram of dry albumin-freed calf blood extract.

4,177,262

PLASMINOGEN COMPOSITIONS CONTAINING PREACTIVATED PLASMINOGENS WITH OR WITHOUT NATIVE PLASMINOGENS, PROCESS FOR MAKING SAME, PHARMACEUTICAL COMPOSITIONS AND CONTROL OF BLOOD CLOTS

Jean-Claude Lormeau, Maromme-la-Maine; Jean Choay, Paris, and Jean Goulay, Oissel, all of France, assignors to Choay S.A., Paris, France

Continuation-in-part of Ser. No. 533,631, Dec. 17, 1974, Pat. No. 4,115,551. This application Apr. 6, 1977, Ser. No. 785,166
Claims priority, application France, Apr. 7, 1976, 76 10143
Int. Cl.[2] A61K *35/50, 35/14*
U.S. Cl. 424—105 42 Claims

1. A water-soluble biological composition which has plasminogen activity capable of activation to plasmin, which composition is essentially free of plasmin and which comprises: native plasminogen, which native plasminogen is amino-terminal glutamic acid and a preactivated plasminogen, said preactivated plasminogen having a lower molecular weight than the native plasminogen and differing from the native plasminogen by the absence of a peptide fragment which fragment includes said terminal amino acid, said preactivated plasminogen being present in a proportion of at least about 40% by weight of the total plasminogens, and said preactivated plasminogen comprising lysyl plasminogen.

6. A water-soluble biological composition which has plasminogen activity capable of activation to plasmin, which composition is essentially free of plasmin and essentially free of glutamyl-plasminogen, which composition has its isoelectric points higher than 6.7, and comprises water-soluble preactivated plasminogens, having principally methionine or lysine as the terminal —NH_2 aminoacids, derived from glutamyl-plasminogen by its loss of a peptide fragment, which fragment includes amino-terminal glutamic acid, and which composition is capable of being fixed essentially in its entirety on a fibrin clot and to remain so fixed after washing with a solution buffered to a neutral pH.

4,177,263

ANTI-ANIMAL TUMOR METHOD

Barnett Rosenberg, Holt; Loretta VanCamp, East Lansing, and Thomas Krigas, Okemos, all of Mich., assignors to Research Corporation, New York, N.Y.

Continuation of Ser. No. 405,184, Oct. 10, 1973, abandoned, which is a continuation of Ser. No. 230,533, Feb. 28, 1972, abandoned, which is a continuation of Ser. No. 30,239, Apr. 20, 1976, abandoned. This application Dec. 27, 1976, Ser. No. 754,512
Int. Cl.[2] A61K *33/24, 31/28*
U.S. Cl. 424—131 4 Claims

1. A method of treating animal malignant tumor cells sensitive to cis-$Pt(II)(NH_3)_2Cl_2$ in animals which comprises parenterally administering to an animal afflicted with said tumor cells a solution containing cis-$Pt(II)(NH_3)_2Cl_2$ in an amount sufficient to cause regression of the animal tumor cells.

4,177,264

N-BENZYL ANTHRACYCLINES

Helen Y. Wu, San Jose; Thomas H. Smith, San Carlos, both of Calif., and David W. Henry, Chapel Hill, N.C., assignors to SRI International, Menlo Park, Calif.

Continuation-in-part of Ser. No. 842,787, Oct. 17, 1977, abandoned. This application Oct. 2, 1978, Ser. No. 947,874
Int. Cl.[2] A61K *31/71;* C07H *15/24*
U.S. Cl. 424—180 15 Claims

14. A pharmaceutical composition in sterile aqueous form for treating leukemia L1210 and P388 in mice comprising an amount within the range from about 0.1 to about 500 mg, effective to ameliorate leukemia, of at least one compound selected from the group consisting of N-benzyldaunomycin, N-benzyl-13-dihydrodaunomycin, N-benzyladriamycin, N-benzyl-13-dihydroadriamycin, N,N-dibenzyldaunomycin, N,N-dibenzyl-13-dihydrodaunomycin and N,N-dibenzyladriamycin and their pharmaceutically acceptable acid addition salts, together with a pharmaceutically acceptable nontoxic, sterile, inert, aqueous carrier or diluent therefor.

4,177,265

PROCESS FOR THE PURIFICATION OF AMPHOTERICIN B AND A SOLUBILIZING MEDIA USEFUL IN THAT PROCESS

Gerd W. Michel, Princeton, and Elizabeth A. Fralick, North Brunswick, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Mar. 2, 1977, Ser. No. 773,584
Int. Cl.[2] A61K *31/71, 35/00*
U.S. Cl. 424—181 13 Claims

6. A process for the purification of amphotericin B which comprises:

(i) forming a solution of amphotericin B in a salt saturated solution wherein the salt is sodium iodide or sodium thiocyanate and the solvent is acetone or methanol;

(ii) separating out amphotericin B extract from insolubles;

(iii) combining the amphotericin B extract with a solvent mixture comprising N,N-dimethylformamide, methanol, and water;

(iv) heating the slurry of amorphous material to form crystalline amphotericin B; and

(v) recovering the crystalline amphotericin B.

4,177,266
PAIN RELIEF COMPOSITION AND METHOD OF PREPARING SAME

Mary A. Moore, Carlisle, Ky., assignor to James Richard Bean, Laurel, Md.

Filed Jan. 2, 1979, Ser. No. 167
Int. Cl.[2] A61K *35/78*
U.S. Cl. 424—195 **10 Claims**

1. A pain relief composition prepared by the process comprising:
(a) establishing a predetermined quantity of roots from the genus Phytolacca and Burdock in an aqueous environment to form an initial mixture;
(b) heating said initial mixture for a predetermined time interval to form a suspension including an extract of a combination of said Phytolacca, Burdock and remaining bulk material thereof;
(c) cooling said aqueous suspension; and,
(d) incorporating a predetermined quantity of isopropyl alcohol to said aqueous suspension.

4,177,267
ENHANCING TISSUE PENETRATION OF PHYSIOLOGICALLY ACTIVE STEROIDAL AGENTS WITH DMSC

Robert J. Herschler, Camas, Wash., assignor to Crown Zellerbach, San Francisco, Calif.

Division of Ser. No. 69,155, Sep. 2, 1970, Pat. No. 3,711,606, which is a continuation-in-part of Ser. No. 753,231, Aug. 16, 1968, Pat. No. 3,551,554, which is a continuation-in-part of Ser. No. 329,151, Dec. 9, 1963, abandoned. This application Nov. 6, 1972, Ser. No. 304,283
Int. Cl.[2] A61K *31/10, 37/40*
U.S. Cl. 424—238 **10 Claims**

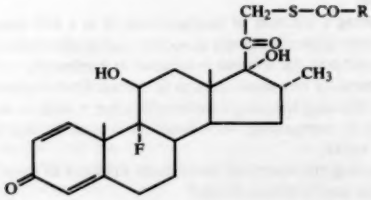
1. A method of enhancing the penetration into and across an external membrane barrier of a human or animal subject to a physiologically active steroidal agent capable of eliciting a physiological effect upon topical application thereof, which comprises the concurrent topical administration to the external membrance of an amount of said steroidal agent effective to produce the desired physiological effect and an amount of DMSO sufficient to effectively enhance penetration of said steroidal agent to achieve the desired physiological effect.

4,177,268
METHOD OF ALLEVIATING INFLAMMATION BY ADMINISTRATION OF DEXAMETHASONE DERIVATIVES

Dieran R. Torossian, Bourg-la-Reine; Gilbert G. Aubard, and Jacky M. Legeai, both of Palaiseau, all of France, assignors to Jouveinal S.A., Cachan, France

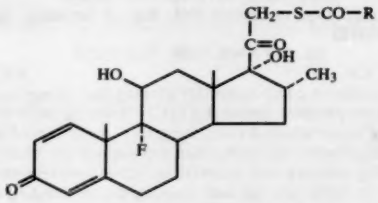
Continuation-in-part of Ser. No. 473,388, May 28, 1974, Pat. No. 4,014,909. This application Jan. 4, 1977, Ser. No. 756,601
Claims priority, application France, May 30, 1973, 73 19734
Int. Cl.[2] A61K *31/56*; C07J *7/00, 31/00*
U.S. Cl. 424—243 **18 Claims**

1. A method for the alleviation of inflammation without causing any noticeable systemic effect which comprises administering to a host a antiinflammatory-effective amount of a dexamethasone derivative of the formula



in which R represents an alkyl radical comprising a number of carbon atoms between 4 and 9 or a para-fluoro-phenyl radical.

15. A pharmaceutical composition comprising 0,005 to 5% of a dexamethasone derivative of the formula



in which R represents an alkylradical having from 4 to 9 carbon atoms or the para-fluoro phenyl radical, and an acceptable pharmaceutical carrier, this composition being presented in the form of a lotion, a spray, ear, ophtalmic or nasal drops, a mouthwash, injectable solutions, pastilles, ointments, creams, oral or rectal suspensions, and the like.

18. The 21-p-fluoro-thio-benzoate of dexamethasone.

4,177,269
NOVEL 17-ESTERS OF 17α-HYDROXY GESTOGENS, COMPOSITIONS CONTAINING SUCH COMPOUNDS, PROCESSES FOR THEIR PREPARATION AND METHODS OF TREATMENT THEREWITH

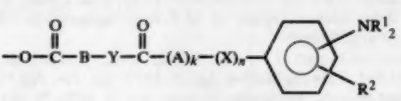
Hans Fex; Bertil Hansen, both of Helsingborg; Krister Holmberg, Angelholm; Bertil Högberg, and Imre Könyves, both of Helsingborg, all of Sweden, assignors to Aktiebolaget Leo, Sweden

Filed Jan. 17, 1977, Ser. No. 760,152
Claims priority, application United Kingdom, Jan. 22, 1976, 02419/76
Int. Cl.[2] A61K *31/56*
U.S. Cl. 424—243 **18 Claims**

1. Novel compounds having the general formula

St—R

wherein R is



where R^1 is a β- or γ-halogensubstituted alkyl group having 2 to 4 carbon atoms, the halogen being chlorine or bromine;
where R^2 is selected from the group consisting of hydrogen, lower alkyl, lower alkoxy, and halogen;
where A is a straight hydrocarbon chain having at most 4 carbon atoms and being saturated or containing one double bond, at most 2 hydrogen atoms of A being replaced by lower alkyl and at most one of the hydrogen atoms situated at the carbon atom adjacent to a

group being replaced by a group selected from the group consisting of amino and lower alkanoylamino;
where B is a straight saturated hydrocarbon chain having at most 4 carbon atoms, at most 2 hydrogen atoms of B being replaced by lower alkyl;
where X and Y are independently selected from the group consisting of —O—, —NH, and —S—;

where k and n are independently selected from the group consisting of zero and one, n always being zero when k is zero; and

where St is the radical of a steroid having a cyclopentanophenanthrene carbon-carbon skeleton containing up to a maximum of 40 carbon atoms, inclusive of substituents, said carbon-carbon skeleton having a steroid nucleus selected from the group consisting of pregnane and 19-norpregnane nuclei, having up to a maximum of two double bonds, said steroid radical being attached at its 17-position to R, said position being identified according to steroid nomenclature, wherein said steroid radical St, has a nucleus selected from the group consisting of: pregn-4-ene-3,20-dione, pregna-4,6-diene-3,20-dione, and 19-norpregn-4-ene-3,20-dione nuclei; and

wherein any further substitution present in the carbon-carbon skeleton of said steroid nucleus of said steroid radical is at most a tetrasubstitution, where the positions of the steroid carbon-carbon skeleton which are substituted are selected from the positions consisting of 1-, 2-, 6-, and 16-positions, where the substitution, if any, comprises at least one substituent selected from the group consisting of methyl, methylene, fluoro, and chloro.

14. A pharmaceutical composition, comprising about 0.01 to about 75 weight percent of a compound of claim **1** and a pharmaceutical carrier.

4,177,270

SOIL FUNGICIDAL (NITROGEN HETEROCYCLIC)-SUBSTITUTED-1,3-BENZODITHIOLE-2-ONES

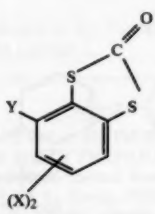
Khalid Rasheed, Weslaco, and James D. Warkentin, McAllen, both of Tex., assignors to The Ansul Company, Marinette, Wis.

Division of Ser. No. 618,255, Sep. 30, 1975, Pat. No. 4,084,954. This application Dec. 14, 1977, Ser. No. 860,455

Int. Cl.[2] **A01N** *9/22*; **C07D** *265/30*

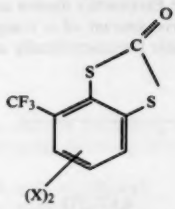
U.S. Cl. 424—248.51 **9 Claims**

1. A compound selected from the group consisting of those of the formula:



wherein Y is selected from nitro and trifluoromethyl; each X independently is selected from alkyl and alkenyl of up to six carbon atoms, nitro, trichloromethyl, trifluoromethyl, trifluoromethoxy, trifluoromethylthio, trifluoromethylsulfoxyl, trifluoromethylsulfonyl, methoxymethyl, cyano, carboxy, carbamyl, halogen (F, Cl, Br, I), hydroxy, acetylamino, amino, N-phenylamino, N,N-diallylamino, alkoxy, dimethylaminodithiocarbamyl, carboalkoxy, alkylthio, mono- and dialkylamino, N-alkylcarbamyl, N,N-dialkylcarbamyl, alkylsulfoxy, alkylsulfonyl, N-morpholino, N-piperidino, N-piperazino or N-pyrrolidino, said alkyl and alkoxy groups containing from 1 to 4 carbon atoms, wherein at least one of said X groups is selected from N-morpholino, N-piperidino, N-piperazino or N-pyrrolidino; and a salt thereof.

6. A method of treating soil fungi associated with growing plants to beneficially enhance the growth and/or yield-potential of said growing plants which comprises applying a soil fungicidally active amount of a compound selected from the group consisting of those of the formula:



wherein each X independently is selected from alkyl and alkenyl of up to six carbon atoms, nitro, trichloromethyl, trifluoromethyl, trifluoromethoxy, trifluoromethylthio, trifluoromethylsulfoxyl, trifluoromethylsulfonyl, methoxymethyl, cyano, carboxy, carbamyl, halogen (F, Cl, Br, I), hydroxy, acetylamino, amino, N-phenylamino, N,N-diallylamino, alkoxy, dimethylaminodithiocarbamyl, carboalkoxy, alkylthio, mono- and dialkylamino, N-alkylcarbamyl, N,N-dialkylcarbamyl, alkylsulfoxy, alkylsulfonyl, N-morpholino, N-piperidino, N-piperazino, N-pyrrolidino, said alkyl and alkoxy groups containing from 1 to 4 carbon atoms, wherein at least one of said X groups is selected from N-morpholino, N-piperidino, N-piperazino or N-pyrrolidino; and salts thereof, at a rate of from 0.25 to 40.0 lbs. a.i./acre.

4,177,271

HYDROXY- AND OXO-SUBSTITUTED α-BENZYLIDENYLCYCLOALKANES

Francois M. J. Vallet, Paris, France, assignor to Unicler, Paris, France

Filed Jul. 25, 1978, Ser. No. 927,777

Claims priority, application France, Aug. 4, 1977, 77 24062

Int. Cl.[2] **C07D** *317/48, 407/08*

U.S. Cl. 424—248.57 **4 Claims**

1. 2-piperonylidene-6-morpholinomethylcyclohexanol.

2. 2-piperonylidene-6-methylcyclohexanol.

4,177,272

DISUBSTITUTED PIPERAZINES

Gilbert Regnier, Chatenay-Malabry; Roger Canevari, Elancourt; Michel Laubie, Vaucresson, and Jean-Claude Poignant, Bures sur Yvette, all of France, assignors to Science Union et Cie, Suresnes, France

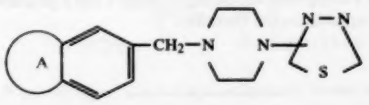
Filed Dec. 27, 1977, Ser. No. 864,204

Claims priority, application United Kingdom, Dec. 31, 1976, 54398/76

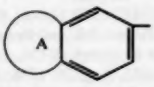
Int. Cl.[2] **A61K** *31/50*; **C07D** *417/14*

U.S. Cl. 424—250 **7 Claims**

1. A compound of the formula



wherein the group



is selected from the group consisting of naphthyl, benzo [b] furanyl, benzo [b] thienyl, benzodioxolyl, benzodioxanyl, benzodioxacycloheptanyl, coumaranyl, chromanyl, Δ^3-chromenyl, thiochromanyl and Δ^3-thiochromenyl.

6. A pharmaceutical composition for treating peripheral vascular disorders or Parkinson's disease containing as active ingredient an effective amount of a compound of claim 1, together with a suitable pharmaceutically acceptable carrier.

4,177,273

6-(SUBSTITUTED PHENYL)-4,5-DIHYDRO-PYRIDAZIN-3(2H)-ONES

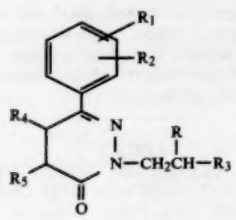
Gregory B. Bennett, Mendham, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Continuation-in-part of Ser. No. 768,558, Feb. 14, 1977, abandoned. This application Jun. 14, 1978, Ser. No. 915,549

Int. Cl.[2] **C07D** *237/04;* **A61K** *31/50*

U.S. Cl. 424—250 **14 Claims**

1. A compound of the formula



where

R is lower alkyl having 1 to 4 carbon atoms and

R_1 and R_2 each independently represent hydrogen, fluorine, chlorine, lower alkyl having 1 to 4 carbon atoms, lower alkoxy having 1 to 4 carbon atoms, amino, nitro or trifluoromethyl,

R_3 is hydrogen, hydroxy or lower alkanoyloxy having 2 to 5 carbon atoms,

R_4 is hydrogen or lower alkyl having 1 to 4 carbon atoms; and

R_5 is hydroxy or lower alkanoyl having 2 to 5 carbon atoms, provided (a) that when both R_1 and R_2 represent trifluoromethyl or tert-butyl they are on other than adjacent carbon atoms; (b) that when R_1 is nitro, R_2 is hydrogen or nitro; (c) that when R_3 is hydrogen, R_5 is hydroxy; and (d) that when R_3 is alkanoyloxy, R_5 is lower alkanoyl having the same number of carbon atoms as R_3.

12. A pharmaceutical composition useful as a minor tranquilizer, anti-convulsant, and muscle relaxant comprising a minor tranquilizer, anti-convulsant, and muscle relaxant effective amount of a compound according to claim 1 and a pharmaceutically acceptable carrier therefore.

4,177,274

SUBSTITUTED IMIDAZO [1,2-A] PYRIDINES

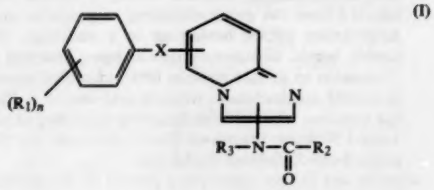
Richard J. Bochis, East Brunswick, and Peter Kulsa, Plainfield, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 718,652, Aug. 26, 1976, Pat. No. 4,096,264, Continuation-in-part of Ser. No. 639,034, Dec. 9, 1975, abandoned. This application Jun. 5, 1978, Ser. No. 912,594

Int. Cl.[2] **C07D** *471/04;* **A61K** *31/44*

U.S. Cl. 424—256 **11 Claims**

1. A compound having the formula:



(I)

wherein:

X is oxygen;

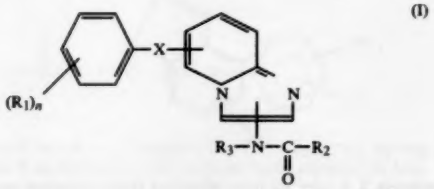
R_1 is halogen, trifluoromethyl, loweralkyl, loweralkoxy, loweralkoxycarbonyl, loweralkylthio, loweralkylsulfinyl, lowera. lysulfonyl, loweralkanoyl, hydroxy, sulfonamido, mono- or di-loweralkylsulfonamido, amino, mono- or di-loweralklyamino, carboxy, carboxamido, mono- and di-loweralkylcarboxamido, loweralkanolyloxy, loweralkoxycarbonylamino, loweralkanoylamino, cyano or nitro;

n is 1 or 2, such that when n is 2, the two R_1 groups need not be identical;

R_2 is loweralkyl or loweralkoxy; and

R_3 is hydrogen, loweralkyl, loweralkenyl, or loweralkyl substituted with loweralkoxy, loweralkoxycarbonyl, carboxy, loweralkylthio, loweralkylsulfinyl, loweralkylsulfonyl, amino and mono- or di-loweralklylamino, phenyl, halophenyl, or loweralkoxyphenyl.

10. An anthelmintic composition which comprises a pharmaceutically acceptable inert carrier and an effective amount of a compound having the formula:



(I)

wherein

X is oxygen,

R_1 is halogen, trifluoromethyl, loweralkyl, loweralkoxy, loweralkoxycarbonyl, loweralkylthio, loweralkylsulfinyl, loweralkylsulfonyl, loweralkanoyl, hydroxy, sulfonamido, mono- or di-loweralkylsulfonamido, amino, mono- or di-loweralkylamino, carboxy, carboxamido, mono- and di-loweralkylcarboxamido, loweralkanoyloxy, loweralkoxycarbonylamino, loweralkanoylamino, cyano or nitro;

n is 1 or 2, such that when n is 2, the two R_1 groups need not be identical;

R_2 is loweralkyl or loweralkoxy; and

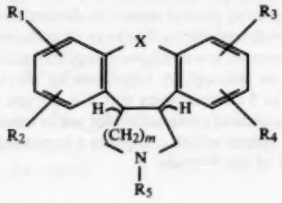
R_3 is hydrogen, loweralkyl, loweralkenyl, or loweralkyl substituted with loweralkoxy, loweralkoxy carbonyl, carboxy, loweralkylthio, loweralkylsulfinyl, loweralkylsulfonyl, amino and mono- or di-loweralkylamino, phenyl, halophenyl, or loweralkoxyphenyl.

4,177,275
TENSION REDUCING 2,3,4,4a,9,13b-HEXAHYDRO-1H-DIBENZO[b,f] PYRIDO[3,4-d]AZEPINE DERIVATIVES

Willem J. van der Burg, Heesch, Netherlands, assignor to Akzona Inc., Asheville, N.C.

Division of Ser. No. 798,222, May 18, 1977, Pat. No. 4,145,434. This application Jun. 26, 1978, Ser. No. 918,883
Claims priority, application Netherlands, May 24, 1976, 7605526
Int. Cl.[2] A61K *31/445;* C07D *471/04*
U.S. Cl. 424—256 28 Claims

28. Method of reducing tension in humans, comprising administering to a human a tension-reducing amount of a compound of the formula:



or a pharmaceutically acceptable non-toxic salt or nitrogen oxide thereof;
wherein:
R_1, R_2, R_3, and R_4 represent a member selected from the group consisting of hydrogen, hydroxy, halogen, C_1–C_6 alkyl, C_1–C_6 alkoxy, C_1–C_6 alkylthio, and trifluoromethyl;
R_5 represents hydrogen, C_1–C_6 alkyl or aralkyl having from 7 to 10 carbon atoms;
X represents

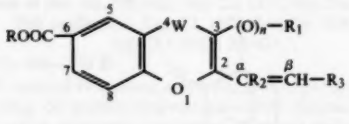
wherein R_6 is a hydrogen or C_1–C_6 alkyl; and
m represents the number 2.

4,177,276
SUBSTITUTED 2-VINYL-CHROMONES AND PROCESS FOR THEIR PREPARATION

Gianfederico Doria, Milan; Ciriaco Romeo, Serino; Francesco Lauria, Milan; Maria L. Corno, Milan; Piernicola Giraldi, Milan, and Marcello Tibolla, Canale d'Agordo, all of Italy, assignors to Farmitalia Carlo Erba, S.p.A., Milan, Italy

Division of Ser. No. 803,947, Jun. 6, 1977. This application Jul. 24, 1978, Ser. No. 927,594
Claims priority, application Italy, Jun. 16, 1976, 24356 A/76; Jan. 12, 1977, 19193 A/77
Int. Cl.[2] C07D *401/06*
U.S. Cl. 424—263 8 Claims

1. A compound of formula



(1)

wherein
n is zero;
R is hydrogen or C_1–C_{12} alkyl, unsubstituted or substituted by a C_2–C_5 alkanoyloxy or by a

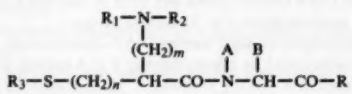
group, wherein each of R_4 and R_5 is independently selected from the group consisting of hydrogen and C_1–C_{10} alkyl;
R_1 is C_2–C_4 alkyl or C_3–C_4 alkenyl;
R_2 is hydrogen or methyl;
R_3 is pyridyl, unsubstituted or substituted by a methyl group;
W is >C=O or >C=S, and a pharmaceutically acceptable salt thereof.

4,177,277
METHOD FOR ALLEVIATING HYPERTENSION

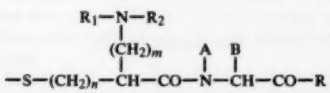
Miguel A. Ondetti, Princeton, and Michael E. Condon, Lawrenceville, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 846,738, Oct. 31, 1977, Pat. No. 4,146,611, which is a continuation-in-part of Ser. No. 759,685, Jan. 17, 1977, Pat. No. 4,113,715. This application Sep. 15, 1978, Ser. No. 942,563
Int. Cl.[2] C01F *17/00*
U.S. Cl. 424—263 14 Claims

1. A method for alleviating hypertension in hypertensive mammals which comprises administering an effective dose of a compound having the formula



or salt thereof,
wherein
R is hydroxy or lower alkoxy
R_1 is hydrogen, lower alkanoyl or amino(imino)methyl;
R_2 is hydrogen, lower alkyl or phenyl-lower alkylene;
R_3 is hydrogen, lower alkanoyl, benzoyl or



A is hydrogen, lower alkyl or hydroxy-lower alkylene;
B is hydrogen, lower alkyl, phenyl, phenyl-lower alkylene, hydroxy-lower alkylene, hydroxyphenyl-lower alkylene, amino-lower alkylene, guanidino-lower alkylene, imidazolyl-lower alkylene, indolyl-lower alkylene, mercapto-lower alkylene, lower alkylthio-lower alkylene, carbamoyl-lower alkylene or carboxy lower alkylene; or A and B together form a $(CH_2)_p$ bridge which completes an unsubstituted ring of 5 or 6 atoms with the nitrogen and carbon to which they are joined or said ring substituted with a hydroxy group;
m is 1, 2, 3 or 4;
n is 0 or 1; and
p is 3 or 4.

4,177,278

2-ALKYLENEAMINODIHYDROPYRIDINES COMPOUNDS, THEIR PRODUCTION AND THEIR MEDICINAL USE

Friedrich Bossert, Wuppertal; Egbert Wehinger, Velbert; Arend Heise, Wuppertal; Stanislav Kazda, Wuppertal; Kurt Stoepel, Wuppertal; Robertson Towart, Wuppertal; Wulf Vater, Leverkusen, and Klaus Schlossmann, Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

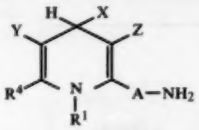
Filed Mar. 15, 1978, Ser. No. 886,971

Claims priority, application Fed. Rep. of Germany, Apr. 5, 1977, 2715182; Sep. 6, 1977, 2740080

Int. Cl.[2] C07D *213/55;* A61K *31/44*

U.S. Cl. 424—266 **17 Claims**

1. A 2-Alkleneaminodihydropyridine of the general formula or pharmaceutically acceptable salts thereof



(I)

in which R^1 is hydrogen, alkyl having from 1 to 4 carbon atoms, alkoxyalkyl having a total of from 2 to 4 carbon atoms or aralkyl having 6 to 10 carbon atoms in the aryl moiety and 1 to 4 carbon atoms in the alkyl moiety

A is a straight-chain or branched divalent alkylene radical, having 1 to 4 carbon atoms,

Y and Z are the same or different and each is

(a) a grouping $COOR^2$,

wherein

R^2 is alkyl, alkenyl, alkinyl, alkoxyalkyl, hydroxyalkyl, aminoalkyl, alkylaminoalkyl, alkylaminoaralkyl or aralkyl, wherein each of the alkyl groups and moieties have 1 to 4 carbon atoms, each of said alkenyl and alkinyl groups have 2 to 6 carbon atoms and each of said aralkyl groups and moieties have 6 to 10 carbon atoms;

R^4 is hydrogen, or alkyl having 1 to 4 carbon atoms, optionally substituted by alkoxy having 1 to 4 carbon atoms, or is a radical $A—NH_2$, wherein A has the same meaning as defined hereinbefore, and

X is phenyl or naphthyl optionally substituted by from one to two identical or different substituents each of which is halogen, nitro, cyano, trifluoromethyl, amino, alkoxy having from 1 to 4 carbon atoms, or alkylmercapto having from 1 to 4 carbon atoms.

4,177,279

1-[(3-INDOLYL)-ALKYL]-PIPERIDYL UREAS AND HYPOTENSIVE COMPOSITIONS

John L. Archibald, Windsor, and John L. Jackson, Royston, both of England, assignors to John Wyeth & Brother Ltd., Taplow, England

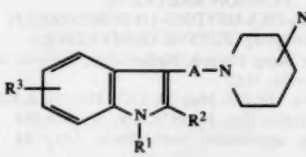
Continuation-in-part of Ser. No. 511,415, Oct. 2, 1974, abandoned. This application Jul. 21, 1975, Ser. No. 597,841

Claims priority, application United Kingdom, Oct. 10, 1973, 47208/73; Jan. 25, 1974, 03531/74; Feb. 18, 1974, 07277/74

Int. Cl.[2] A61K *31/445;* C07D *401/06*

U.S. Cl. 424—267 **18 Claims**

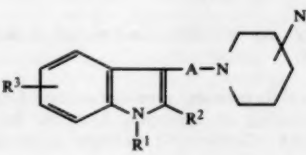
1. A compound of general formula I



I

and pharmaceutically acceptable acid addition and quaternary ammonium salts thereof, wherein R represents hydrogen or lower alkyl, R^1 represents hydrogen or lower alkyl, R^2 represents hydrogen or lower alkyl, R^3 represents hydrogen, halogen, lower alkoxy, hydroxy, or lower alkyl, R^4 represents hydrogen, lower alkyl, cycloalkyl of 5 to 7 carbon atoms, thienyl, furyl, phenyl; phenyl mono- or disubstituted by halogen, lower alkyl, lower alkoxy, hydroxy or trifluoromethyl; or benzoyl, halobenzoyl, lower alkanoyl, cycloalkanoyl of 6 to 8 carbon atoms, or thienoyl, A represents an alkylene radical having from 1 to 5 carbon atoms and X is oxygen or sulphur.

17. A pharmaceutical composition for use in treatment of the cardiovascular system which comprises a hypotensive amount of a compound of the formula:



and pharmaceutically acceptable acid addition and quaternary ammonium salts thereof, wherein R represents hydrogen or lower alkyl, R^1 represents hydrogen or lower alkyl, R^2 represents hydrogen or lower alkyl, R^3 represents hydrogen, halogen, lower alkoxy, hydroxy, or lower alkyl, R^4 represents hydrogen, lower alkyl, cycloalkyl of 5 to 7 carbon atoms, thienyl, furyl, phenyl; phenyl mono- or disubstituted by halogen, lower alkyl, lower alkoxy, hydroxy or trifluoromethyl; or benzoyl, halobenzoyl, lower alkanoyl, cycloalkanoyl of 6 to 8 carbon atoms, or thieno A represents an alkylene radical having from 1 to 5 carbon atoms and X is oxygen or s and a pharmaceutically acceptable carrier.

4,177,280

BICYCLO[3.1.0]HEXYL-SUBSTITUTED CARBONYLAMINOPHENOXY CARDIOVASCULAR AGENTS

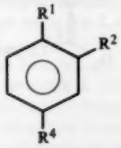
Karl G. Untch; Belig Berkoz, both of Los Altos, and Stefan H. Unger, Palo Alto, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Jul. 3, 1978, Ser. No. 921,371

Int. Cl.[2] C07C *103/19, 127/15;* A61K *31/42, 31/17*

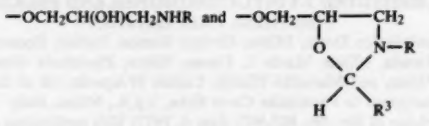
U.S. Cl. 424—272 **61 Claims**

1. A compound of the formula

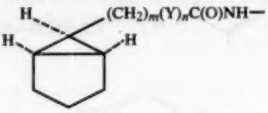


(I)

wherein R^1 is selected from the group



and R is C_1 to C_4 linear or branched alkyl; R^2 is selected from the group hydrogen, halo, nitrile, C_1 to C_2 alkyl, C_1 to C_2 alkoxy, acetyl and propanoyl; R^3 is hydrogen, C_1 to C_4 linear or branched alkyl or C_6 to C_{10} carbocyclic aryl optionally substituted with halo, C_1 to C_4 linear or branched alkyl, C_1 to C_4 linear or branched alkoxy, C_2 to C_4 linear or branched acyl, C_1 to C_4 linear or branched carboalkoxy, nitrile or nitro; and R^4 is the group



where Y is the radical

where R^5 is hydrogen or C_1 to C_4 linear or branched alkyl, n is the integer 0 or 1 and m is the integer 1 to 4 and pharmaceutically acceptable salts thereof.

21. A pharmaceutical composition for treating cardiovascular disorders in mammals by blocking the beta-adrenergic receptor sites, consisting essentially of a pharmaceutically acceptable carrier and an amount effective to block said beta-adrenergic receptor sites of an agent selected from the group of compounds of claim **1** and mixtures thereof.

4,177,281

THERAPEUTIC TREATMENT FOR MEASLES VIRAL INFECTION

James B. Mercer, 13109 W. 95th St., Lenexa, Kans. 66215

Continuation-in-part of Ser. No. 656,336, Feb. 9, 1976, Pat. No. 4,073,928. This application Feb. 10, 1978, Ser. No. 876,618

Int. Cl.[2] **A61K** *31/415*

U.S. Cl. 424—273 R **4 Claims**

1. A method for treating a human host having a measles infection comprising:

(a) repeatedly orally administering anti-measles infection effective amounts of a pharmaceutical composition which contains, as an active ingredient, 1-(β-hydroxethyl)-2-methyl-5-nitromidazole to a human host in need of said treatment.

4,177,282

HYDANTOIN THERAPEUTIC AGENTS

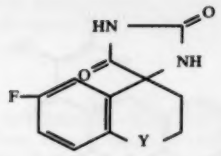
Reinhard Sarges, Mystic, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 799,586, May 23, 1977, Pat. No. 4,130,714. This application Aug. 22, 1978, Ser. No. 935,979

Int. Cl.[2] **A61K** *31/415*

U.S. Cl. 424—273 R **3 Claims**

1. A method of treating a diabetic host to prevent or alleviate ocular or neuritic diabetes-associated chronic complications, which comprises administering to said diabetic host an alleviating or prophylactically effective amount of a compound selected from the group consisting of the dextrorotatory isomers of asymmetric spirohydantoins of the formula:



and the base salts thereof with pharmacologically acceptable cations, where Y is oxygen or sulfur.

4,177,283

AROMATIC PROSTAGLANDIN ANALOGUES

Frederick Cassidy, Harlow, and Gordon Wootton, Sawbridgeworth, both of England, assignors to Beecham Group Limited, England

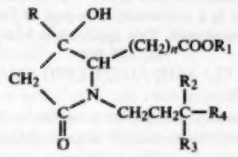
Division of Ser. No. 732,726, Oct. 15, 1976, Pat. No. 4,138,407. This application May 5, 1978, Ser. No. 903,143

Claims priority, application United Kingdom, Oct. 25, 1975, 43990/75; May 22, 1976, 21278/76

Int. Cl.[2] **C07D** *207/26;* **A61K** *31/40*

U.S. Cl. 424—274 **18 Claims**

1. A compound of the formula:



wherein

n has a value of from 4 to 8;

R is hydrogen or alkyl of 1 to 4 carbon atoms;

R_1 is hydrogen, alkyl of 1 to 12 carbon atoms, phenyl, benzyl or toluyl;

R_3 is hydroxy, alkanoyloxy of 1 to 4 carbon atoms or benzyloxy;

R_2, when taken independently of R_4, is hydrogen or alkyl of 1 to 9 carbon atoms; and

R_4 is cycloalkyl of 5 to 8 carbon atoms, phenyl, naphthyl or alkyl of 1 to 6 carbon atoms substituted with cycloalkyl of 5 to 8 carbon atoms, phenyl or naphthyl, said phenyl and naphthyl being unsubstituted or substituted with from one to three members selected from the group consisting of halo, trifluoromethyl, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms and nitro; or

R_2 and R_4 together with the carbon atom to which they attached are cycloalkylidene of 5 to 8 carbon atoms, and the pharmaceutically acceptable salts thereof when R_1 is hydrogen.

17. A pharmaceutical composition having natural prostaglandin-like activity consisting essentially of a compound according to claim **1** in an effective amount for such activity and a pharmaceutically acceptable carrier.

4,177,284

2-SUBSTITUTED-3-METHYL-γ-PYRONE TRICVCLIC DERIVATIVES AND PROCESS THEREFOR

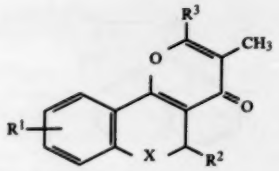
Adolf H. Philipp, St. Laurent, and Ivo L. Jirkovsky, Montreal, both of Canada, assignors to Ayerst McKenna & Harrison Ltd., Montreal, Canada

Filed Nov. 28, 1977, Ser. No. 855,538

Int. Cl.[2] **A61K** *31/38;* **C07D** *495/04*

U.S. Cl. 424—275 **15 Claims**

1. A compound of formula I



(I)

in which R^1 is hydrogen, halogen, nitro, trifluoromethyl, lower alkyl or lower alkoxy; R^2 is hydrogen or lower alkyl; R^3 is hydroxy, or $COOR^4$ wherein R^4 is hydrogen or lower alkyl, and X is S, SO or SO_2, or a therapeutically acceptable salt thereof.

4,177,285

[1-OXO-2-THIENYL-2-SUBSTITUTED-5-INDANYLOXY (OR THIO)]ALKANOIC ACIDS AND DERIVATIVES THEREOF

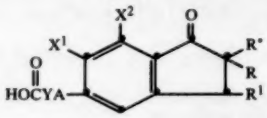
Edward J. Cragoe, Jr., Lansdale, and Otto W. Woltersdorf, Jr., Chalfont, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 585,434, Jun. 10, 1975, Pat. No. 4,096,267, which is a continuation-in-part of Ser. No. 492,651, Jul. 30, 1974, abandoned, which is a continuation-in-part of Ser. No. 405,736, Oct. 11, 1973, abandoned. This application Mar. 23, 1978, Ser. No. 889,161

Int. Cl.[2] A61K *31/125;* **C07D** *333/10*

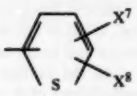
U.S. Cl. 424—275 **18 Claims**

5. A pharmaceutical composition useful in the treatment of edema and hypertension which also maintains uric acid at pretreatment levels or causes a decrease in uric acid levels which comprises a therapeutically effective amount of a compound of the formula:



wherein

R^o is



A is oxygen or sulphur;

R is lower alkyl, lower alkenyl, phenyl lower alkyl, phenyl lower alkenyl, phenyl, thienyl, cycloalkyl, or cycloalkyl lower alkyl;

R^1 is hydrogen, lower alkyl, or aryl; or

R^1 and R may be joined together to form a cycloalkylene;

Y is alkylene or haloalkylene containing from 1 to about 4 carbon atoms;

X^7 is hydrogen, lower alkyl or halogen;

X^8 is hydrogen or lower alkyl;

X^1 is hydrogen, halo or methyl;

X^2 is halo, methyl or trihalomethyl; or

X^1 and X^2 may be joined together to form a hydrocarbylene chain containing from 3 to about 4 carbon atoms;

and the non-toxic, pharmacologically acceptable salt, amide, anhydride, and ester derivatives thereof, and a pharmaceutically acceptable carrier.

4,177,286

SUBSTITUTED 2-VINYL-CHROMONES AND PROCESS FOR THEIR PREPARATION

Gianfederico Doria, Milan; Giriaco Romeo, Serino; Francesco Lauria, Milan; Maria L. Corno, Milan; Piernicola Giraldi, Milan, and Marcello Tibolla, Canale D'Agordo, all of Italy, assignors to Farmitalia Carlo Erba, S.p.A., Milan, Italy

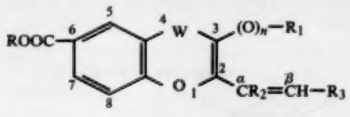
Division of Ser. No. 803,947, Jun. 6, 1977. This application Jul. 24, 1978, Ser. No. 927,008

Claims priority, application Italy, Jun. 16, 1976, 24356 A/76; Jan. 12, 1977, 19193 A/77

Int. Cl.[2] C07D *407/06*

U.S. Cl. 424—283 **8 Claims**

1. A compound of formula



(I)

wherein

n is zero

R is hydrogen or C_1–C_{12} alkyl, unsubstituted or substituted by a C_2–C_5 alkanoyloxy or by a

group, wherein each of R_4 and R_5 is independently selected from the group consisting of hydrogen and C_1–C_{10} alkyl;

R_1 is C_2–C_4 alkyl or C_3–C_4 alkenyl;

R_2 is hydrogen or methyl;

R_3 is unsubstituted furyl

W is >C=O or >C=S, and a pharmaceutically acceptable salt thereof.

4,177,287

PHARMACEUTICAL COMPOSITIONS OF N_1-ACYL-N_2-PHENYLDIAMINOPROPANOLS AND PROCESS FOR THEIR PREPARATION

Hans Liepmann; Rolf Hueschens, both of Hanover; Wolfgang Milkowski, Burgdorf; Horst Zeugner; Henning Heinemann, both of Hanover; Klaus-Ullrich Wolf, Haenigsen; Insa Hell, and Reinhard Hempel, both of Hanover, all of Fed. Rep. of Germany, assignors to Kali-Chemie Pharma GmbH, Hanover, Fed. Rep. of Germany

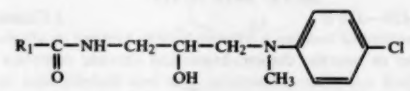
Filed Apr. 28, 1978, Ser. No. 900,973

Claims priority, application Fed. Rep. of Germany, May 10, 1977, 2720908

Int. Cl.[2] A61K *31/34, 31/165*

U.S. Cl. 424—285 **16 Claims**

1. A pharmaceutical composition in dosage-unit-form for oral administration comprising an ulcus-inhibiting effective amount of from about 50 to about 150 mg per single dosage-unit of at least one pharmacologically active compound selected from the group of N_1-acyl-N_2-(4-chlorophenyl)-1,3-diaminopropan-2-ols, having the formula



(I)

wherein R_1 represents 3,4-dimethoxyphenyl, 2-fluorophenyl, 2-trifluoromethylphenyl, or furyl, and pharmaceutically ac-

ceptable acid addition salts thereof, and a pharmaceutically acceptable diluent.

4,177,288

COMPOSITION FOR CONTROLLING FUNGI

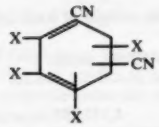
Arthur F. Gohlke, Atlanta, Ga., assignor to Cities Service Company, Tulsa, Okla.

Continuation-in-part of Ser. No. 798,725, May 19, 1977, abandoned. This application Aug. 28, 1978, Ser. No. 937,392

Int. Cl.[2] A01N *9/02*

U.S. Cl. 424—294 7 Claims

1. A fungicide composition comprising, in combination, from about 19 wt % to about 50 wt % of a halogenated aromatic dinitrile having the structure



wherein each X is selected from the group consisting of hydrogen, chlorine, fluorine and bromine with at least one X being other than hydrogen; from about 19 wt % to about 50 wt % of copper salts of fatty and rosin acids, from about 0.05 wt % to about 15 wt % surfactant, and from about 2 wt % to about 60 wt % carrier, said copper salts comprising from about 20 wt % to about 30 wt % copper oleate, from about 15 wt % to about 25 wt % copper linoleate, from about 45 wt % to about 55 wt % copper abietate, from 1 wt % to about 2 wt % copper palmitate and copper stearate.

4,177,289

PESTICIDAL USE OF N-CHLOROCROTYL ACYL COMPOSITIONS

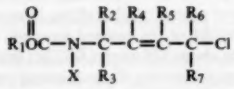
Francis A. Daniher, Ann Arbor, Mich., and Alexis A. Oswald, Mountainside, N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Continuation-in-part of Ser. No. 579,455, May 21, 1975, Pat. No. 4,146,557, which is a continuation-in-part of Ser. No. 688,308, Dec. 6, 1967, Pat. No. 3,884,963. This application Apr. 24, 1978, Ser. No. 899,079

Int. Cl.[2] A01N *9/20*

U.S. Cl. 424—300 11 Claims

1. A method of controlling soil fungi comprising applying to soil containing said fungi an effective quantity of a fungicide composition of the formula



wherein R_2 to R_7 are selected from the group consisting of hydrogen, chlorine, fluorine and alkyl groups having from 1 to 30 carbon atoms, R_1 is selected from the group consisting of C_1 to C_{30} alkyl or substituted alkyl wherein the substituents are selected from the group consisting of halo and nitro and X is selected from the group consisting of hydrogen and chlorine.

4,177,290

ACETAMIDE DERIVATIVES

Louis Lafon, Paris, France, assignor to Laboratoire L. Lafon, Maisons Alfort, France

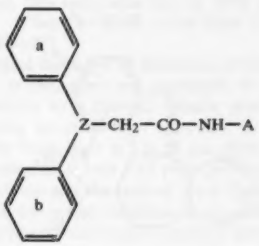
Filed Mar. 9, 1978, Ser. No. 885,009

Claims priority, application United Kingdom, Mar. 31, 1977, 13579/77

Int. Cl.[2] A61K *31/165;* C07C *103/22, 103/82, 103/76*

U.S. Cl. 424—324 6 Claims

1. An acetamide derivative selected from the compounds of formula I



(I)

wherein ring a and ring b are each substituted zero, one or more times by substituents selected from the group consisting of fluoro, chloro, bromo, trifluoromethyl, nitro, amino, alkyl of 1 to 4 carbon atoms, inclusive, alkoxy of 1 to 4 carbon atoms, inclusive, and methylenedioxy; wherein Z is the radical >CHSO—; and wherein A is selected from the group consisting of hydrogen, alkyl of 1 to 4 carbon atoms, inclusive, hydroxyalkyl of 1 to 4 carbon atoms, inclusive, and a group of formula R_1R_2N—Y—wherein Y is a divalent linear or branched chain hydrocarbon radical having 1 to 4 carbon atoms, inclusive, in the chain, and R_1 and R_2, being the same or different, are selected from the group consisting of hydrogen and alkyl of 1 to 4 carbon atoms, inclusive; and addition salts of the compounds wherein A is a basic group.

5. A pharamaceutical composition having activity on the central nervous system and consisting of, as an essential active ingredient, an active amount of a compound of claim 1.

4,177,291

COMPOUNDS HAVING ANTIDEPRESSIVE ACTIVITY

Ulf H. A. Lindberg; Svante B. Ross, both of Södertälje; Seth O. Thorberg, Järna, and Sven O. Ögren, Södertälje, all of Sweden, assignors to Astra Lakemedel Aktiebolag, Södertälje, Sweden

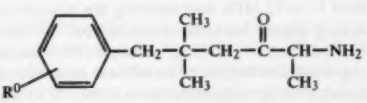
Filed Aug. 23, 1977, Ser. No. 827,085

Claims priority, application Sweden, Aug. 25, 1976, 7609385

Int. Cl.[2] A01N *9/20, 9/24;* C07C *97/10*

U.S. Cl. 424—330 15 Claims

1. A compound of the general formula



(I)

or a pharmaceutically acceptable acid addition salt thereof, in which formula the group R^0 is selected from the group consist-

ing of hydrogen, chlorine, bromine, methyl, trifluoromethyl and methoxy.

4,177,292

NOVEL 5H-BENZOCYCLOHEPTEN-7-AMINES

Lucien Nedelec, Le Raincy; Daniel Frechet, Paris; Claude Dumont, Nogent-sur-Marne, and Peter Hunt, Gonesse, all of France, assignors to Roussel Uclaf, Paris, France

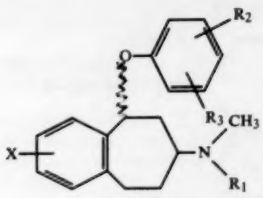
Filed Nov. 13, 1978, Ser. No. 959,943

Claims priority, application France, Nov. 18, 1977, 77 34738

Int. Cl.[2] A61K *31/135;* C07C *91/16, 91/28, 91/40*

U.S. Cl. 424—330 26 Claims

1. A compound of the formula



wherein R_1 is selected from the group consisting of hydrogen and methyl, R_2 and R_3 are individually selected from the group consisting of hydrogen, fluorine, chlorine, bromine, nitro, amino, $-CF_3$ and methoxy, X is selected from the group consisting of hydrogen and halogen and their non-toxic, pharmaceutically acceptable acid addition salts and the wavy line indicates that the substituent in the 5 position may be in the cis or trans form.

4,177,293

PROCESS OF MANUFACTURE OF A BUTTER SPREAD

Ladislav Formán; Zdenek Pech, both of Prague, and Václav Vondrúska, Liberec, all of Czechoslovakia, assignors to Mlekarensky prumysl, generalni reditelstvi, Prague, Czechoslovakia

Filed Nov. 15, 1978, Ser. No. 960,787

Int. Cl.[2] A23C *9/12*

U.S. Cl. 426—43 13 Claims

1. Process for the manufacture of a butter-spread comprising the steps of forming a mixture of sweet cream and a thickening agent selected from the group consisting of dried milk, protein concentrates and mixtures thereof, pasteurizing said mixture, cooling the pasteurized mixture, adding a clean milk culture, submitting the cooled mixture to a first homogenizing step at temperatures between about 20° C. and 30° C. and pressures between about 10 to 25 MPa, and maturing the mixture until it is acidified to a degree between about 68° to 112° Dornic, adding a foodstuff water stabilizer in amount between about 0.5 to 5% by weight, submitting the mixture to a second homogenizing step at temperatures between about 65° C. and 80° C. and at a pressure of about 5 MPa, cooling the second homogenized mixture to at least about 10° C. to further cure the butterspread.

4,177,294

AQUEOUS CLEANING CONCENTRATE FOR THE CLEANING OF FOODSTUFF

Hans-Jüergen Lehmann, Mettmann; Rolf Bietz, Monheim, and Jüergen Wegner, Düsseldorf, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien (Henkel KGaA), Düsseldorf-Holthausen, Fed. Rep. of Germany

Filed Oct. 3, 1978, Ser. No. 948,221

Claims priority, application Fed. Rep. of Germany, Oct. 8, 1977, 2745371

Int. Cl.[2] A23L *3/34*

U.S. Cl. 426—271 8 Claims

1. An aqueous concentrate for the cleansing of foodstuffs of animal or vegetable origin, consisting of:

(a) from 0.1% to 10% by weight of water-soluble to water-dispersible proteins,

(b) from 0.01% to 3% by weight of water-soluble polymers having a molecular weight of at least 10,000,

(c) from 1% to 15% by weight of a water-soluble sequestering agent,

(d) from 0.01% to 1% by weight of water-soluble food preservatives,

(e) from 0 to 0.5% by weight of food colors and food odorants, and

(f) the remainder to 100%, water.

4,177,295

METHOD FOR STABILIZING COLLOIDAL AND TASTE QUALITIES OF BEVERAGES

Vladimir Kubánek, Kralupy n. Vlt.; Gabriela Basařová, Prague; Jaroslav Králiček, Prague; Josef Skach, Prague; Zdenek Fencl, Prague; Jiří Budín, Sezimovo Usti; Jaroslava Kondeliková, Prague, and Eduard Sittler, Sezimovo Usti, all of Czechoslovakia, assignors to Vysoka skola chemicko-technologicka, Prague, Czechoslovakia

Filed Apr. 20, 1978, Ser. No. 898,413

Int. Cl.[2] A23L *1/26*

U.S. Cl. 426—330.3 13 Claims

1. Method for stabilizing the colloidal and taste qualities of beverages evidencing turbidity precursors and enzymes which comprises the steps of:

(a) contacting the beverage with an organic polymer selected from the group consisting of polyethylene terephthalate, isophthalic acid modified polyethylene terephthalate, and a mixture of polyethylene terephthalate and polybutylene terephthalate and at a temperature ranging from 28.4° to 176° F., in an amount sufficient to reduce the concentration of cloudiness precursors and undesirable enzymes and

(b) separating the polymer from said beverage.

4,177,296

PROCESS FOR THE PREPARATION OF PEANUT-CURD

Keizo Mochizuki, and Iwao Hachiya, both of Kawasaki, Japan, assignors to Meiji Seika Co., Ltd., Tokyo, Japan

Filed Jul. 17, 1978, Ser. No. 925,240

Int. Cl.[2] A23L *1/01, 1/20*

U.S. Cl. 426—632 10 Claims

1. A process for the preparation of peanut-curd, which comprises the steps of roasting raw peanuts with the red skin intact for 60 to 15 minutes at a temperature of from 110° C. to 120° C., removing the red skin pressing the deskinned peanuts to partially remove peanut oil therefrom in an amount of from 10 to 30% by weight of the roasted peanuts, pulverizing the pressed peanuts to about 325 mesh (ASTM) at a temperature of −40° C. or below, dissolving the pulverized peanuts in from 5 to 8.5 parts by weight of water per part of pulverized peanuts, the water being at a temperature ranging from 5° C. to 50° C., boiling the resulting mixture for 1 to 5 minutes, cooling the mixture to 70° C. to 80° C., and adding thereto a coagulant to solidify the cooled mixtureand thereby obtain peanut-curd.

4,177,297
MAGNETIC BUBBLE LATTICE DEVICE

Richard M. Josephs, Willow Grove, Pa., assignor to Sperry Rand Corporation, New York, N.Y.

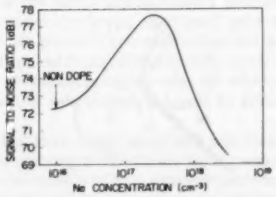
Continuation of Ser. No. 618,868, Oct. 2, 1975, abandoned. This application Feb. 4, 1977, Ser. No. 765,157
Int. Cl.[2] H01F *10/02*
U.S. Cl. 427—38 9 Claims

1. The method of fabricating magnetic domain wall structures of a bubble lattice and stabilizing same comprising:
a. forming a non-magnetic substrate material having a preferred crystallagraphic axis;
b. tilting said substrate by an angle with respect to said preferred crystallographic axis;
c. depositing a magnetic bubble material on said tilted substrate; said material incorporating more than two bubble types wherein each has different said magnetic domain wall structures,
d. implanting ions into the surface of said magnetic bubble material
e. to provide two stable said domain wall types in the bubble lattice to define different binary information;
f. said two domain wall types being stabilized without use of an external in-plane field.

4,177,298
METHOD FOR PRODUCING AN INSB THIN FILM ELEMENT

Junji Shigeta, Fuchu; Tetsu Oi, Tokyo; Nobuo Kotera, Kokubunji; Muneyasu Nakashima, Tokyo, and Nobuo Miyamoto, Hachioji, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Mar. 20, 1978, Ser. No. 888,465
Claims priority, application Japan, Mar. 22, 1977, 52/30328; Mar. 25, 1977, 52/32189
Int. Cl.[2] H01L *21/22, 21/203, 21/205*
U.S. Cl. 427—85 24 Claims



1. A method for producing an InSb thin film element, comprising the step of forming by an evaporation method an InSb polycrystalline thin film having a thickness of 0.1 μm–3 μm on a predetermined substrate, the step of subjecting said thin film to zone melting to melt and recrystallize the InSb polycrystalline thin film at a temperature above the melting point of InSb, and then the step of holding a diffusion source in contact with said thin film, said diffusion source comprising at least one substance containing at least one element selected from the group consisting of Cu, Au, Ag, Zn, Na, K, Cd, B, Li, Ca, Fe, Mg, Ba, Al and Pb, and heating said thin film at a temperature below the melting point of InSb so as to dope the thin film with said at least one element to have a dopant concentration of not greater than 1×10^{18} cm^{-3}, whereby a thin film element having a high signal-to-noise ratio is formed.

4,177,299
ALUMINUM OR ALUMINUM ALLOY ARTICLE AND PROCESS

Harald Severus, Schaffhausen, and Horst Birkmaier, Neuhausen am Rheinfall, both of Switzerland, assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Continuation-in-part of Ser. No. 872,751, Jan. 27, 1978, abandoned. This application Jul. 12, 1978, Ser. No. 923,825
Int. Cl.[2] B32B *15/20;* C23F *5/04*
U.S. Cl. 427—287 14 Claims

1. An object made out of aluminum or aluminun alloys in a form such as foil, sheet and containers for use in preparing colored articles by a thermal transfer printing process, said object having an oxide layer produced by anodic oxidation wherein the oxide layer is 5 to 25 μm thick, exhibits a crack-free elongation of at least 0.65 parts per thousand in the non-sealed condition and the ratio of crack-free elongation of the oxide in the non-sealed condition to the crack-free elongation in the colored and non-sealed condition lies between 1:1.2 and 1:5.5.

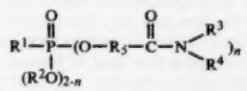
8. In a thermal transfer printing process for coloring a shaped article of aluminum or aluminum alloys, the step of coloring said article by a thermal transfer printing method, wherein said article has an oxide layer produced by anodic oxidation wherein the oxide layer is 5 to 25 μm thick, exhibits a crack-free elongation of at least 0.65 parts per thousand in the non-sealed condition and the ratio of the crack-free elongation of the oxide in the non-sealed condition to the crack-free elongation in the colored and non-sealed condition lies between 1:1.2 and 1:5.5.

4,177,300
PHOSPHONOXYCARBOXAMIDE FLAME RETARDING COMPOSITIONS

Edward N. Walsh, New City, and Ralph B. Fearing, Bardonia, both of N.Y., assignors to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 837,072, Sep. 28, 1977. This application May 12, 1978, Ser. No. 905,307
Int. Cl.[2] C07F *9/11, 9/40*
U.S. Cl. 427—390 D 7 Claims

1. A flame-retardant composition comprising:
(1) at least one compound represented by the formula:



wherein R^1 and R^2 are selected from the group consisting of aryl and alkyl having from 1–6 carbon atoms and may be the same or different; R^3 represents hydrogen or —CH_2OH; R^4 represents hydrogen, —CH_3, —CH_2OH, or —C_2H_4OH, R^5 represents an alkyl group having 1–5 carbon atoms and n represents 1 or 2;
(2) an aminoplast; and
(3) an acid catalyst.

4,177,301

PRIMER COMPOSITIONS FOR ADHERING SILICONE COMPOSITIONS

Alfred H. Smith, Jr., Ballston Lake, N.Y., assignor to General Electric Company, Waterford, N.Y.

Division of Ser. No. 736,381, Jan. 28, 1977. This application Dec. 22, 1977, Ser. No. 863,118
Int. Cl.[2] B05D *1/36, 7/02*
U.S. Cl. 427—401 8 Claims

1. A method for adhering silicone compositions to plastic substrates comprising (a) applying to said substrate a layer of (1) the reaction product of a reaction mixture of an alkyl acrylate or alkyl methacrylate where the alkyl group can be methyl or butyl and mixtures thereof and of an acrylate silane of the formula,

$$X\ Si\ Y_3$$

in an organic solvent where X is selected from the class consisting of

$$CH_2=CHCOO(CH_2)_3-$$

and

$$CH_2=C(CH_3)COO(CH_2)_3-$$

and Y is a hydrolyzable radical wherein there is present prior to reaction from 1 to 12 mols of said methacrylate per mole of said silane, and (2) a silane of the formula, X Si Y_3 where X and Y are as specified above, and (b) covering said layer with a silicone composition.

4,177,302

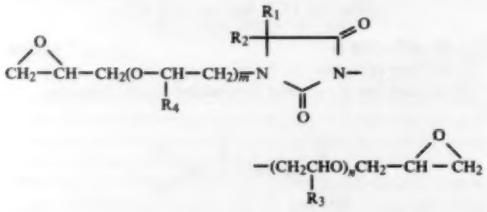
TOP COAT COMPOSITION TO IMPROVE MARINE ANTIFOULING PERFORMANCE

Jonas Weiss, Portchester, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed May 30, 1978, Ser. No. 910,256
Int. Cl.[2] B32B *27/38;* B63B *9/00*
U.S. Cl. 427—407 C 8 Claims

1. An improved process for controlling the rate of leaching of toxicant from a marine antifouling paint by applying on the surface of the paint an incompletely cured topcoat and allowing it to cure thereon, wherein the improvement comprises the topcoat being derived from an ambient-temperature curing system which comprises

(1) a diglycidyl derivative of 5,5-dilower-alkylhydantoins which have the following formula



in which R_1 and R_2 each denote a lower alkyl residue having 1 to 4 carbon atoms, R_3 and R_4 each denote a hydrogen atom or a lower alkyl residue having 1 to 2 carbon atoms and n and m each represent an integer from 0 to 4, which is soluble in or dispersible in water.

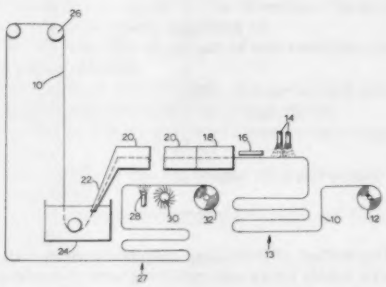
(2) a polyamidoamine, which is dispersible in water, in a stoichiometry of 0.8 to 1.2 equivalents of amine per epoxide equivalent.

4,177,303

METHOD OF GALVANIZING A PORTION ONLY OF A FERROUS METAL ARTICLE

Robert H. Clipston, Hamilton; Emerson O. Hall, Burlington, and Hon-Hei F. Ng, Hamilton, all of Canada, assignors to Dominion Foundries and Steel, Limited, Hamilton, Canada

Continuation-in-part of Ser. No. 789,828, Apr. 22, 1977, abandoned. This application Jul. 13, 1978, Ser. No. 924,297
Int. Cl.[2] B05D *1/18, 1/38*
U.S. Cl. 427—259 25 Claims



1. A method of galvanizing a portion only of a ferrous metal article, including the steps of:

applying to the portion of the article that is not to be galvanized a suspension comprising a liquid suspending vehicle consisting of water and from 5 to 20% by weight of the suspension of the hydrated form of magnesium silicate known as talc suspended in the water and drying the suspension to form a dried coating on the said portion that will prevent the adhesion of molten zinc to the said coated portion,

galvanizing the uncoated portion of the article by dipping in a bath of molten zinc, and

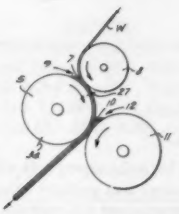
removng the coating from the article.

4,177,304

METHOD OF COATING BOTH SIDES OF A TRAVELLING WEB

Kenneth W. Berry, Beloit, Wis., assignor to Beloit Corporation, Beloit, Wis.

Division of Ser. No. 778,506, Mar. 17, 1977, Pat. No. 4,108,110. This application Jan. 10, 1978, Ser. No. 868,396
Int. Cl.[2] B05D *1/18*
U.S. Cl. 427—434 R 6 Claims



1. A method of puddle coating both sides of a travelling web, comprising:

forming a first puddle of coating material in generally upwardly directed trough at the upper side of a first nip of a first horizontal roll and a second horizontal roll;

forming a second puddle of coating material below said first nip in a generally upwardly directed trough at the upper side of a second nip formed by said second roll and a third roll;

running one side of a continuously travelling web in firm engagement directly with the perimeter of said first roll through said first puddle and said first nip and thereby coating the opposite side of said web in said first puddle while protecting said one side against the coating material of the first puddle by running of the one face in said engagement with the perimeter of said first roll;

below said first nip running said coated opposite side of the web in direct engagement with the perimeter of said second roll and through said second puddle and said second nip and thereby exposing the uncoated side of the web to the coating material in said second puddle and maintaining the coated side of the web in said running engagement with said third roll and thereby protecting said coated side of the web from the coating material in said second puddle;

and preventing migration of coating material via the opposite ends of said second roll from either of said puddles to the other of said puddles.

4,177,305

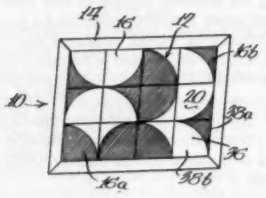
WALL HANGING

David A. Feingold, and Susan R. Feingold, both of 2111 Glen Flora, Waukegan, Ill. 60085

Filed Aug. 7, 1978, Ser. No. 931,426

Int. Cl.[2] B44F *11/04*

U.S. Cl. 428—13 **22 Claims**



1. A wall hanging, comprising:

a selectively variable picture having a plurality of movable tile means positioned generally adjacent each other in a longitudinal and lateral array, said tile means having complementary configurations and being interchangeable;

each tile means having a single thin walled viewable picture surface facing generally forward with a peripheral edge and having a thin walled skirt extending generally rearwardly from said periphery edge, said thin walled skirt having a rearward edge and a rearward dimension defining the thickness of said tile means;

said viewable picture surface being generally planar and spanning a distance substantially greater than the thickness of said tile means and defining a geometric center;

at least one eccentric image positioned generally adjacent said viewable picture surface at a location geometrically offset and spaced from said geometric center;

each of said tile means being movable for selectively varying the position of said eccentric image to attain a different picture;

said thin walled skirt cooperating with said viewable picture surface for defining a rearwardly facing socket positioned generally rearwardly of said viewable picture surface, said socket having a minimum cross-sectional area slightly less than the maximum surface area of said viewable picture surface and having a lateral shape and configuration substantially similar to the shape and configuration of said viewable picture surface;

said thin walled skirt and said thin walled viewable surface having wall thicknesses substantially less than the minimum distance across said socket for minimizing the weight and amount of material needed to fabricate said tile means;

picture support means generally covered by and positioned rearwardly of said selectively variable picture for supporting said selectively variable picture on a wall, said picture support means having a generally planar backing surface positioned generally parallel to said viewable picture surfaces for supportingly engaging said rearward edges of said tile means and having a plurality of complementary configured pegs having a configuration generally complementary and similar to said tile means, said pegs extending forwardly from said backing surface generally towards said viewable picture surfaces and aligned in registration with said sockets for matingly engaging said tile means;

each of said pegs having a front surface and side wall means extending between and connecting said front surface to said backing surface, said side wall means engaging said skirt and extending forwardly a sufficient distance to position said front surface closely adjacent said viewable picture surface;

said front surface being generally planar and spanning a distance substantially greater than said forward distance of said side wall means, and said front surface being positioned generally parallel to and rearwardly of said viewable picture surface; and

frame means connected to and extending outwardly of said picture support means for decoratively surrounding and containing said selectively variable picture.

4,177,306

LAMINATED SECTIONAL GIRDER OF FIBER-REINFORCED MATERIALS

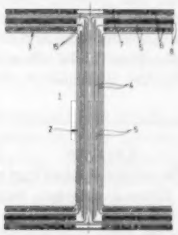
Ralf-Thilo Schulz, Putzbrunn; Klaus Brunsch, Weidach, and Ludwig Lemmer, Ottobrunn, all of Fed. Rep. of Germany, assignors to Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung, Munich, Fed. Rep. of Germany

Filed May 12, 1977, Ser. No. 796,414

Claims priority, application Fed. Rep. of Germany, May 19, 1976, 2622163

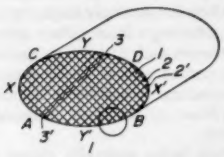
Int. Cl.[2] B32B *5/12, 7/00*

U.S. Cl. 428—107 **11 Claims**



1. In a longitudinal laminated construction girder consisting of at least one web portion and at least one flange portion, said web and flange portions extending transversely to each other, with each being formed of a plurality of layers, each of said layers consisting essentially of a fiber reinforced structure formed of thermosetting-resin-impregnated fibers, the improvement comprising: that both said web and flange portions are each structured to consist of at least three of said layers; that said layers include at least two connecting layers which extend through both said web and flange portions; that said connecting layers are constructed with crossing fiber applications which include fibers extending at an angle transversely to the longitudinal direction of said girder; and that said at least one flange portion includes at least one flange layer which extends exclusively through said flange portion and is located between said at least two connecting layers extending through said flange portion; said at least one flange layer being structured to include unidirectional fiber applications which extend parallel to said longitudinal direction of said girder.

4,177,307
THERMAL SHOCK RESISTANT CERAMIC HONEYCOMB STRUCTURES
Yukio Torii, Mons, Belgium, and Takao Nakamura, Nagoya, Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan
Filed Mar. 6, 1978, Ser. No. 883,948
Claims priority, application Japan, Mar. 12, 1977, 52-27173
Int. Cl.[2] B32B *3/12*
U.S. Cl. 428—116 7 Claims



1. Thermal shock resistant ceramic honeycomb structures in which the shape of a multiplicity of parallel channels extending therethrough is quadrilateral and the outer periphery shape of the vertical cross-section of said honeycomb is an ellipse having an X-axis along its long diameter and a Y-axis along its short diameter, the honeycomb having first and second groups of parallel partitions forming the quadrilateral channel, said first group of partitions being inclined at an angle of more than 10° against the X-axis, said second group of partitions being parallel to or inclined against the Y-axis.

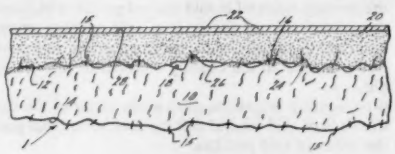
4,177,308
NON-COMBUSTIBLE HIGH TEMPERATURE ABRADABLE SEAL MATERIAL
David R. Beeler, Fairfield, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.
Filed Aug. 10, 1978, Ser. No. 932,814
Int. Cl.[2] C04B *21/00*
U.S. Cl. 428—117 11 Claims

1. A sealant composition for jet engines, said composition being in the form of a syntactic foam and comprising a major amount of aluminum phosphate and a minor amount of silica or glass microballoons having a diameter of about 10 to 300 microns.

4,177,309
DRY TRANSFER MATERIALS
Philip Shadbolt, and Helen Ganszczyk, both of London, England, assignors to Letraset USA Inc., Bergenfield, N.J.
Filed Oct. 26, 1977, Ser. No. 845,608
Claims priority, application United Kingdom, Nov. 5, 1976, 46262/76
Int. Cl.[2] B32B *7/14*
U.S. Cl. 428—195 13 Claims

1. In a dry transfer material consisting essentially of a flexible light transmitting carrier sheet, a plurality of transferable indicia on the carrier sheet and a coating of adhesive substance on the indicia and overlapping on to the surface of the carrier sheet, the improvement wherein the adhesive substance contains dry transfer adhesive components and a detackifying wax containing polar groups prior to being deposited on said indicia and said adhesive is deposited on to said indicia and overlapping on to said carrier sheet from a solution or dispersion in at least one organic solvent the concentration of the wax and the nature of the indicia being such that on the deposition of the adhesive composition from the solution or dispersion in at least one organic solvent and drying down of the adhesive by the evaporation thereof an interaction occurs between the adhesive and the indicia whereby the surface tack of the adhesive over the indicia is greater than the surface tack of the adhesive on the carrier between the indicia.

4,177,310
METHOD OF METALLIZING PAPER
Robert W. Steeves, Nahant, Mass., assignor to King Seeley Thermos Company, Winchester, Mass.
Filed Jul. 27, 1978, Ser. No. 928,587
Int. Cl.[2] B05D *3/06*
U.S. Cl. 428—216 19 Claims



1. The process of metallizing paper comprising the steps of:
(A) coating a surface of a paper substrate with a solventless thin film consisting essentially of a radiation curable resin precursor;
(B) immediately contacting said film with electron radiation sufficient to cure said precursor before said precursor has penetrated into said paper substrate a distance sufficient to cause detrimental stiffening thereof; and
(C) metallizing the exposed surface of said film.

15. A metallized paper product comprising a paper substrate with a smooth continuous, cured, coherent resin film on one side thereof, said film having limited penetration into the paper substrate, being substantially entirely within the adjacent quarter of the paper cross-section thickness, and further comprising fibrous matter of the paper substrate intermixed in said resin coating up to 25 percent thereof, the outer surface of said resin being overcoated with metal of less than 1/100th thickness of the said resin film.

4,177,311
COMPOSITE FABRIC
John B. Smith, Thornhill; Peter W. Bell, Sanquhar; David S. Queen, Sanquhar, and John Mitchell, Sanquhar, all of England, assignors to Sidlaw Industries Limited, Dundee, Great Britain
Filed Nov. 29, 1978, Ser. No. 964,513
Claims priority, application United Kingdom, Nov. 30, 1977, 49947/77
Int. Cl.[2] B32B *7/00*
U.S. Cl. 428—246 6 Claims

1. A composite fabric comprising a layer of pile-forming material bonded to a substrate material by an interlayer of substantially air-free plastics material having a density in the range 0.9 to 1.5 gm/cc, wherein the substrate material is formed by deaerated plastics material having a weight in the range 0–6.5 kg/sq. meter (0–12 lbs/sq. yard) with a layer of fibrous material embedded therein.

4,177,312
MATTING ARTICLE
Alfred Rasen; Rolf Vollbrecht, and Klemens Schenesse, all of Obernburg, Fed. Rep. of Germany, assignors to Akzona Inc., Asheville, N.C.
Filed May 8, 1978, Ser. No. 903,552
Int. Cl.[2] B32B *7/00*
U.S. Cl. 428—284 10 Claims

1. A coherently self-bonded, low density matting article comprising:
(a) a primary matting layer consisting essentially of a plurality of continuous melt-spun synthetic polymer filaments of a diameter of about 0.1 to 1.5 mm. laid in overlapping rows of irregularly looped and intermingled filaments to

form a peak and valley three-dimensional sheet structure undulating in the longitudinal and/or transverse directions of the matting, the individual filaments in said structure being self-bonded at random points of intersection to provide a transverse strength per unit of surface weight of at least 2 Nm/g, said primary layer having a thickness of about 5 to 70 mm and a surface weight per unit thickness of less than 50,000 g/m^3; and

(b) a secondary footing layer consisting essentially of a substantially flat, thin nonwoven web of synthetic polymer filaments melt-spun as a separate surface sheet and then immediately applied onto one of the undulating faces of said primary matting layer while still tacky such that the freshly melt-spun surface filaments of the nonwoven web become bonded to part of the filaments of said primary matting layer at mutual points of intersection, said footing layer having a substantially lower porosity than said primary matting layer.

4,177,313

AMINE-MODIFIED LIGNOSULFONATE-EXTENDED PHENOL FORMALDEHYDE RESINS

Pierre C. Herault, Decatur, Ga., assignor to Georgia-Pacific Corporation, Portland, Oreg.

Filed Nov. 28, 1978, Ser. No. 964,291
Int. Cl.^{2} C08L *97/00;* C08H *5/02*
U.S. Cl. 428—288 **15 Claims**

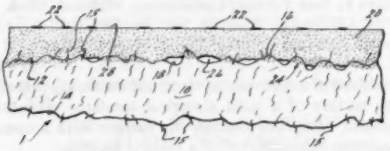
1. A resin binder composition comprising an aqueous solution of a phenol-formaldehyde resole resin and from about 40 to about 100% by weight based on phenol-formaldehyde resin solids of a water-soluble basic amine-modified lignosulfonate said modified lignosulfonate containing from about 2% to about 12% by weight of a water-soluble basic amine and from about 88 to about 98% by weight of a water-soluble lignosulfonate salt.

4,177,314

METHOD OF PRINTING PAPER

Robert W. Steeves, Nahant, Mass., assignor to King Seeley Thermos Company, Winchester, Mass.

Filed Oct. 25, 1978, Ser. No. 954,524
Int. Cl.^{2} B05D *3/06*
U.S. Cl. 428—336 **14 Claims**



1. The process of printing a modified paper substrate comprising the steps of:

(A) coating a surface of a paper substrate with a thin film consisting essentially of a radiation curable resin precursor;

(B) immediately contacting said film with electron radiation sufficient to cure said precursor before said precursor has penetrated into said paper substrate a distance sufficient to cause detrimental stiffening thereof; and

(C) printing on the exposed surface of said film.

11. A printed paper product comprising a paper substrate with a smooth continuous, coherent resin film on one side thereof, said film having limited penetration into the paper substrate, being substantially entirely within the adjacent quarter of the paper cross-section thickness, and further comprising fibrous matter of the paper substrate intermixed in said resin film up to 25 percent thereof, at least portions of the outer surface of said resin film being overcoated with ink.

4,177,315

COATED POLYMERIC SUBSTRATES

Richard W. Ubersax, Parkersburg, W. Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 774,425, Mar. 4, 1977, abandoned. This application Jun. 16, 1978, Ser. No. 916,845
Int. Cl.^{2} C08J *3/02;* C08L *83/04;* B32B *5/16*
U.S. Cl. 428—336 **4 Claims**

1. A polymeric film substrate coated to a thickness of about from 1 to 20 microns with a rapidly curing composition comprising

(a) about from 5 to 50 weight percent solids, the solids comprising about from 10 to 70 weight percent silica and about from 90 to 30 weight percent of a partially polymerized organic silanol of the general formula $RSi(OH)_3$, wherein R is selected from methyl and up to about 40% of a radical selected from the group consisting of vinyl, phenyl, γ-glycidoxypropyl, and γ-methacryloxypropyl, and

(b) about from 95 to 50 weight percent solvent, the solvent comprising about from 10 to 90 weight percent water and about from 90 to 10 weight percent lower aliphatic alcohol,

the coating composition having a pH of about from 6.2 to 6.5.

2. A coated article of claim 1 wherein the substrate consists essentially of polyethylene terephthalate.

4,177,316

IMPREGNATED CARBON BRUSH FOR ELECTRICAL MACHINERY

Winfried Diegelmann, Heuchelheim; Günter Schardt, Giessen; Jochen Klatt, Krofdorf-Gleiberg, and Heinz Grölz, Staufenberg, all of Fed. Rep. of Germany, assignors to Schunk & Ebe GmbH, Postfach, Fed. Rep. of Germany

Filed Aug. 25, 1977, Ser. No. 827,612
Int. Cl.^{2} H01R *39/22;* B05D *5/12;* H01R *39/26*
U.S. Cl. 428—367 **6 Claims**

1. An impregnated carbon brush for electrical machinery for improved running properties and increased wear-resistance, said carbon brush having an impregnating medium selected from the group of a non-melting grease, a non-melting wax, and a non-flowing oil; said impregnating medium being obtained by thoroughly mixing a medium selected from a group of grease, wax and oil with montmorillonite flakes having surfaces coated with long-chain hydrocarbons, and thereby being converted to a non-melting or non-flowing condition.

4,177,317

STABILIZATION OF CHROMIUM DIOXIDE MAGNETIC PIGMENTS

Eduard Schoenafinger, Ludwigshafen; Paul Deigner, Weisenheim; Eberhard Koester; Manfred Ohlinger, both of Frankenthal; Dieter Schaefer; Werner Stumpfl, both of Ludwigshafen; Juergen Amort, Troisdorf; Claus-Dietrich Seiler, Rheinfelden; Heinz Nestler, Troisdorf, and Otto Ambros, Mannheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Continuation of Ser. No. 640,574, Dec. 15, 1975, abandoned. This application May 20, 1977, Ser. No. 801,162
Int. Cl.^{2} H01F *10/02*
U.S. Cl. 428—405 **8 Claims**

1. A process for stabilizing a chromium dioxide magnetic pigment against the loss of its magnetic properties, wherein the chromium dioxide pigment in particle form, suspended in an

alcoholic, aqueous-alcoholic or aqueous medium, is treated with a solution in the said medium of a monomeric silane of the formula

$$R_nSi(OR')_{4-n}$$

where R is an organic radical of 1 to 18 carbon atoms, R' is an aliphatic organic radical of 1 to 8 carbon atoms and n is an integer from 1 to 3, the pH of the suspension being brought to from 2 to 6 or 7.5 to 9.5 and the silanes are hydrolyzed in the presence of the suspended chromium dioxide pigment, so that after isolating the chromium dioxide pigment from the alcoholic, aqueous-alcoholic or aqueous medium, the surfaces of the chromium dioxide particles bear hydrolyzed silane, and the treated chromium dioxide pigment is dried at from about 50° to 200° C.

4,177,318

SPECTROSCOPY

Ernald V. Williams, Llanelli, Wales, assignor to British Steel Corporation, London, England

Filed Jul. 25, 1977, Ser. No. 818,712

Claims priority, application United Kingdom, Aug. 2, 1976, 32120/76; Aug. 13, 1976, 33811/76

Int. Cl.² B32B *9/04;* B05B *5/12*

U.S. Cl. 428—408 **16 Claims**

1. A graphite electrode for use in spectrospopic analysis in which at least the region of the electrode intended for contact with the material to be analysed has a layer comprising the heat reaction product of graphite with a salt of a refractory metal selected from the group consisting of zirconium vanadium, molybdenum, and lanthanum and a salt of an alkali earth metal.

4,177,319

GLASS FOR THE PRODUCTION OF OPTICAL ELEMENTS WITH REFRACTIVE INDEX GRADIENTS

Walter Jahn, Ingelheim, Fed. Rep. of Germany, assignor to JENAer Glaswerk Schott & Gen., Mainz, Fed. Rep. of Germany

Filed Nov. 7, 1978, Ser. No. 958,376

Claims priority, application Fed. Rep. of Germany, Nov. 7, 1977, 2749683

Int. Cl.² C03C *21/00, 3/04*

U.S. Cl. 428—410 **6 Claims**

1. An optical quality glass composition suitable for the production of optical elements with a refractive index gradient delta n of at least 100×10^{-4} by utilizing an ion exchange, consisting essentially of the following synthesis composition, in % by weight:

SiO_2	56–78
MgO	6–15
Li_2O	5–14
Na_2O	3–14
K_2O	0– 9

wherein the total of MgO plus Li_2O is 12–23.

4,177,320

ARTICLE COATED WITH FLUOROCARBON POLYMER

Tatsushiro Yoshimura, Takatsuki; Mutsusuke Namba, Settsu; Seisuke Suzue; Shigetake Tominaga, both of Ibaraki; Toshio Mizuno, Settsu, and Nariyoshi Hayashida, Kyoto, all of Japan, assignors to Daikin Kogyo Co., Ltd., Osaka, Japan

Filed Dec. 6, 1977, Ser. No. 858,063

Claims priority, application Japan, Dec. 10, 1976, 51/148989; Dec. 11, 1976, 51/148937

Int. Cl.² B32B *27/28, 27/18, 27/08*

U.S. Cl. 428—419 **8 Claims**

1. A coated article comprising:
a substrate;
an undercoat formed over said substrate and containing a polyarylene sulfide resin;
a primer coat formed over said undercoat and containing a binder and a fluorocarbon polymer; and a fluorocarbon polymer topcoat.

4,177,321

SINGLE CRYSTAL OF SEMICONDUCTIVE MATERIAL ON CRYSTAL OF INSULATING MATERIAL

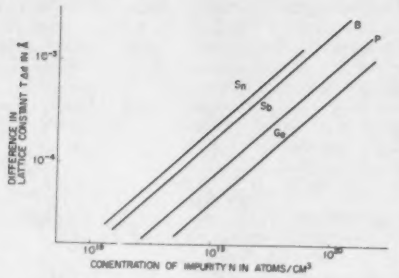
Jun-ichi Nishizawa, Sendai, Japan, assignor to Semiconductor Research Foundation, Japan

Continuation of Ser. No. 693,534, Jun. 7, 1976, abandoned, which is a continuation-in-part of Ser. No. 477,010, Jun. 6, 1974, abandoned. This application May 18, 1978, Ser. No. 907,290

Claims priority, application Japan, Jul. 25, 1972, 47-74483

Int. Cl.² H01L *21/20;* B01J *17/02*

U.S. Cl. 428—446 **9 Claims**



1. A grown crystal structure comprising: a spinel crystal having a lattice constant, a single crystal of semiconductive material having another lattice constant different from that of said spinel crystal and grown on said spinel crystal, said spinel crystal being selected from the group consisting of $MgO.nAl_2O_3$ where n is less than one or $MgO.Al_2O_3$ where the magnesium is present in stoichiometrically excessive amount, and means comprising at least a portion of said spinel crystal adjacent to said single crystal having a changed composition with respect to the remainder thereof for effectively reducing lattice strains developed in the grown crystal structure due to mismatch of the lattice constants between both said single and spinel crystals without adversely affecting the electrical characteristics of said single crystal of semiconductive material.

4,177,322

METHOD OF IMPROVING HIGH VOLTAGE INSULATING DEVICES

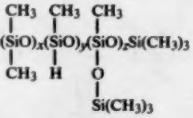
Gary R. Homan, and Chi-Long Lee, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Apr. 28, 1978, Ser. No. 901,053

Int. Cl.² B32B *9/04;* H01B *3/18, 3/46;* B32B *27/08*

U.S. Cl. 428—447 **17 Claims**

1. A method of improving an electrical insulating function of an outer surface of a solid electrical insulator wherein the improvement comprises coating the surface with a composition consisting essentially of of a general formula:



wherein x has an average value of at least 2; y and z each have an average value of 0 to 98; x plus y plus z is equal to a value of from 8 to 200 inclusive; y and z cannot be 0 simultaneously; when x, y, and z each have an average value greater than 0, a

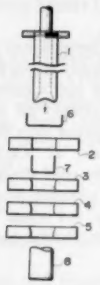
ratio of x to y to z is about 7 to 4 to 1; when y is 0 then the ratio of x to z is from 0.3/1 to 7/1 inclusive and x plus z has a value less than 100; and when z is 0 then the ratio of x to y is from 0.3/1 to 7/1 inclusive and x plus y has a value less than 100.

4,177,323

COATED METAL SHEET FOR USE IN PRODUCING A DRAWN AND IRONED CAN BODY

Tatsuro Obi, Tokyo; Teruo Koyama; Tadashi Tanaka, both of Yokahama, and Atsushi Hasegawa, Osaka, all of Japan, assignors to Nippon Steel Corporation and Sakuranomiya Chemical Co., Ltd., both of, Japan

Filed Dec. 27, 1978, Ser. No. 974,113
Claims priority, application Japan, Dec. 30, 1977, 52-160725
Int. Cl.[2] B32B *15/08*
U.S. Cl. 428—622 **9 Claims**



1. A coated metal sheet adapted for use as a drawn and ironed can body which comprises a metal sheet and a coating composition film completely cured on both of its surfaces or on one surface to be made the outer surface of a can body to be formed with dried film thickness of 2 to 10 μm, said coating composition comprising epoxy-phenolic resin containing (1) an acetal-type resin and (2) an olefin-type hydrocarbon having the chemical formula CnH_{2n} (n=31 to 38) admixed with $CnH_{2n}COOH$ having a molecular weight distribution of 1,000 to 5,000 which is added to the epoxy-phenolic resin in an amount of 0.5 to 2.0% by weight,

said epoxy-phenolic resin being prepared by condensing thermosetting type phenol resin with bisphenol-A-epoxy resin having mean molecular weight of 450 to 3700 at the weight ratio of 25:75 to 10:90,

said thermosetting-type phenol resin being prepared by condensing the mixture of meta-cresol and para-cresol at the weight ratio of 30:70 to 60:40 with formaldehyde in the presence of alkali catalyst.

4,177,324

HARD FACING OF METAL SUBSTRATES USING MATERIAL CONTAINING V, W, MO, C

Harry J. Brown, Lewiston, and Kuldip S. Chopra, Grand Island, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Jun. 30, 1978, Ser. No. 920,827
Int. Cl.[2] B32B *15/16*; C23C *1/00*
U.S. Cl. 428—627 **2 Claims**

1. In a method for hard facing a surface of an iron or iron base alloy substrate by forming a bond between said surface and a hard-facing material, the improvement which comprises employing as hard-facing material solid particles consisting essentially of grains of vanadium carbide having in solid solution from about 10 to 50% by weight tungsten and about 1 to 4% by weight molybdenum and having about 1 to 4% by weight of binder metal between said grains, said binder metal consisting essentially of 90 to 99.98% nickel and 0.02 to 10% molybdenum.

2. A hard faced metal surface formed by providing molten iron or iron base alloy on a portion of an iron or iron base alloy metal substrate, applying to the molten metal a solid composition consisting essentially of grains of vanadium carbide having in solid solution from about 10 to 50% by weight tungsten and

about 1 to 4% by weight molybdenum and having about 1 to 4% by weight of binder metal between said grains, said binder metal consisting essentially of about 90 to 99.98% nickel and 0.02 to 10% molybdenum.

4,177,325

ALUMINIUM OR COPPER SUBSTRATE PANEL FOR SELECTIVE ABSORPTION OF SOLAR ENERGY

Marion L. Roberts; Max H. Sharpe, and Albert C. Krupnick, all of Huntsville, Ala., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Division of Ser. No. 829,390, Aug. 31, 1977, Pat. No. 4,104,134.
This application May 30, 1978, Ser. No. 910,793
Int. Cl.[2] B32B *15/20*
U.S. Cl. 428—629 **4 Claims**

1. A panel for selectively absorbing solar thermal energy comprising:

an aluminum substrate,

a layer of zinc carried on the substrate,

a layer of nickel on the zinc layer distal from the aluminum substrate, and

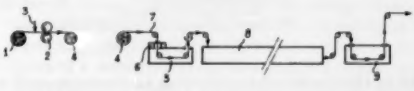
a deep blue, solar thermal energy absorbing layer of nickel oxide on the layer of nickel distal from the aluminum substrate, said nickel oxide layer having a thickness of about 400 to 1000 angstroms.

4,177,326

PROCESS FOR COATING STAINLESS STEEL WITH A LEAD-BASED ALLOY AND ARTICLE

Bernard A. M. Windal, and Edmond Lobry, both of Solesmes, France, assignors to VALLOUREC Usines a Tubes de Lorraine-Escaut et Vallourec Reunies, Paris, France

Filed Dec. 16, 1977, Ser. No. 861,480
Claims priority, application France, Dec. 17, 1976, 76 38192
Int. Cl.[2] C23C *1/06*
U.S. Cl. 428—645 **8 Claims**



1. Process for manufacturing a strip of annealed stainless steel having a lead-based alloy coating, comprising

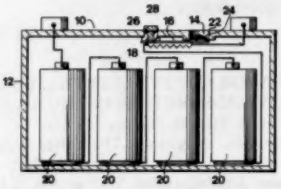
(a) mechanically preparing the surface of a stainless steel strip by cold rolling to remove oxide therefrom;

(b) pre-coating said strip in a lead-based alloy bath;
(c) heat treating the pre-coated strip by passing it through a second bath of the same alloy at an annealing temperature suifficient to render it deformable; and
(d) finally coating said strip by passing it through a third bath of the same alloy at a temperature lower than said annealing temperature.

4,177,327
METAL-AIR BATTERY HAVING ELECTRICALLY OPERATED AIR ACCESS VENT COVER

John P. Mathews, and Michael J. Smith, both of Mississauga, Canada, assignors to P. R. Mallory & Co. Inc., Indianapolis, Ind.

Filed Nov. 20, 1978, Ser. No. 962,514
Int. Cl.[2] H01M *8/04*
U.S. Cl. 429—27 **10 Claims**

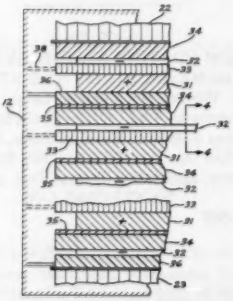


1. A battery case for a metal-air battery, said battery case having a vent and a vent cover therefor to permit gas communication to the interior of the battery case when said vent cover is open; said vent cover having an electrically operated actuator means and being movable upon the application of electrical power to said actuator means at least from a vent-closed to a vent-opened position; a source of electrical power for said electrically operated actuator means; and means for initiating the application of electrical power to said actuator means.

4,177,328
WALL WICK FOR NICKEL-HYDROGEN CELL

Howard H. Rogers, Culver City, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Dec. 19, 1978, Ser. No. 970,910
Int. Cl.[2] H01M *12/06*
U.S. Cl. 429—81 **3 Claims**



1. In an electrochemical cell having an electrode stack contained within the inside wall of a pressure vessel, the said electrode stack having at least a positive electrode, a negative electrode, electrolyte, and a separator, the improvement comprising:

a. a zirconium oxide based ceramic deposited on the said inside wall of the pressure vessel providing a wick for the said electrolyte; and

b. means for placing the said separator in capillary communication with the said ceramic wick whereby electrolyte is returned from the pressure vessel walls to the electrode stack.

4,177,329
ELECTROLYTE SALTS FOR NON AQUEOUS ELECTROCHEMICAL CELLS

Arabinda N. Dey, Needham; John S. Miller, Charlestown, both of Mass., and William L. Bowden, Nashua, N.H., assignors to P. R. Mallory & Co. Inc., Indianapolis, Ind.

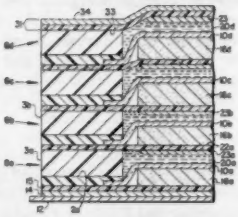
Filed Nov. 2, 1978, Ser. No. 956,833
Int. Cl.[2] H01M *6/14*
U.S. Cl. 429—101 **9 Claims**

1. A non-aqueous electrochemical cell comprising an anode, comprised of one or more metals above hydrogen in the EMF series, a cathode depolarizer and a dissolved electrolyte salt characterized in that the electrolyte salt has the formula $M(ZX_4)_n$ wherein "M" is selected from the group consisting of alkali and alkaline earth metals, "Z" is selected from the group consisting of gallium, indium and thallium, "X" is selected from the group consisting of chlorine, bromine, iodine, fluorine and mixtures thereof, and "n" is 1 when "M" is an alkali metal and "n" is 2 when "M" is an alkaline earth metal.

4,177,330
LAMINAR BATTERIES AND METHODS OF MAKING THE SAME

Michael E. Gordon, Wayland, and Frank Stieger, Newton Highlands, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Continuation of Ser. No. 852,919, Nov. 18, 1977, abandoned. This application Oct. 13, 1978, Ser. No. 951,122
Int. Cl.[2] H01M *6/46*
U.S. Cl. 429—152 **6 Claims**



1. A laminar battery comprising cells chemically isolated and electrically connected in series by conductive plastic intercell connectors and terminated by conductive plastic current collectors, and provided by liquid impervious seals formed by frames, one for each cell, having central openings to receive the wet cell components and placed between and sealed to confronting borders of the conductive plastic current collectors and intercell connectors, in which said frames each comprise at least first and second opposite surface layers essentially parallel to said conductive plastic intercell connectors and current collectors and formed of first and second different thermoplastic thermally activatable adhesive materials, said first layer being thermally activatable at a substantially lower temperature than said second layer.

4,177,331

SULFONE-CROSSLINKED POLYSTYRENE ION EXCHANGE RESIN AND PROCESS OF MANUFACTURE

David R. Amick, Chalfont, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed Jul. 24, 1978, Ser. No. 927,224
Int. Cl.[2] C08G 75/20; C08F 8/34
U.S. Cl. 521—33 4 Claims

1. A process for producing sulfone-crosslinked ion exchange resin beads exhibiting high solids content when saturated with water which comprises reacting linear polystyrene beads with a sulfonating reagent mixture comprising either (1) a mixture of chlorosulfonic acid and sulfur trioxide or (2) a mixture of boron oxide or boric acid

and one or more reagents selected from sulfuric acid, chlorosulfonic acid and sulfur trioxide,

said sulfonating reagent mixture being used in excess of stoichiometric requirements.

4,177,332

1,1,1-TRIFLUORO-2-CHLOROETHANE AS BLOWING AGENT FOR POLYURETHANE FOAM

Karl-Heinz Mitschke, Odenthal; Hans Niederprüm, Monheim, and Manfred Kapps, Berg.-Gladb., all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Aug. 8, 1978, Ser. No. 932,056
Claims priority, application Fed. Rep. of Germany, Aug. 27, 1977, 2738719
Int. Cl.[2] C08G 18/14
U.S. Cl. 521—98 4 Claims

1. In the production of a foamed synthetic material by the reaction of starting materials which undergo a polymerization reaction to produce a high molecular weight synthetic material in the presence of a blowing agent or by foaming an unfoamed thermoplastic synthetic material by means of a blowing agent, the improvement which comprises employing 1,1,1-trifluoro-2-chloroethane as the blowing agent.

4,177,333

CATALYSTS FOR POLYIMIDE FOAMS FROM AROMATIC ISOCYANATES AND AROMATIC DIANHYDRIDES

Salvatore R. Riccitiello; Paul M. Sawko, both of San Jose, and Carlos A. Estrella, Santa Clara, all of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Feb. 24, 1978, Ser. No. 883,961
Int. Cl.[2] C08G 18/14, 18/30, 18/22, 18/24
U.S. Cl. 521—124 7 Claims

1. A process for the preparation of polyimide foams comprising heating in the liquid phase and at a temperature within the range of about 190° C. to 300° C., a reaction mixture consisting essentially of an aromatic polyisocyanate with an aromatic polycarboxylic acid dianhydride, and a catalytic quantity of a metallic salt of octoic acid, the proportions of dianhydride and polyisocyanate ranging from about stoichiometry to a 10% weight excess of polyisocyanate.

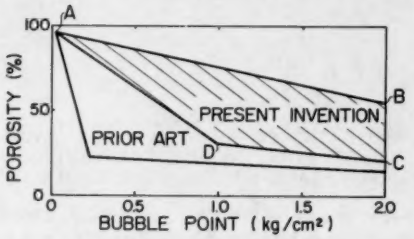
4,177,334

MICROPOROUS TUBES

Koichi Okita, Osaka, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Sep. 12, 1977, Ser. No. 832,267
Claims priority, application Japan, Sep. 13, 1976, 51/110536
Int. Cl.[2] C08J 9/24
U.S. Cl. 521—145 5 Claims

1. A microporous tube composed of a porous polytetrafluoroethylene resin comprising nodules linked to one another by fine filaments prepared by molding a polytetrafluoroethylene resin containing a liquid lubricating agent by a paste method to form a tube, removing said liquid lubricating agent, stretching by drawing said tube in a lengthwise direction using a die and a plug, and sintering at a temperature of about 327° C. or more,



said microporous tube (a) having a porosity and a bubble point in a range between the points A, B, C and D in FIG. 1 and defined in the following table:

	porosity	bubble point
A	96%	0.02 kg/cm^2
B	54%	2.0 kg/cm^2
C	20%	2.0 kg/cm^2
D	30%	1.0 kg/cm^2

and (b) having a ratio of wall thickness to inside diameter of about 0.1 or less.

4,177,335

PROCESS FOR PREPARING A POLYURETHANE FOAM FROM AN OXYALKYLATED PRODUCT

Arthur L. Austin, Southgate; William W. Levis, Jr., Wyandotte; Louis C. Pizzini, Trenton, and Robert J. Hartman, Southgate, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Continuation of Ser. No. 824,279, Aug. 15, 1977, Pat. No. 4,105,597, which is a division of Ser. No. 590,332, Jun. 25, 1975, Pat. No. 4,097,399, and Ser. No. 590,333, Jun. 25, 1975, Pat. No. 4,052,345, which is a division of Ser. No. 425,524, Dec. 17, 1973, Pat. No. 3,957,922. This application Apr. 14, 1978, Ser. No. 896,496
The portion of the term of this patent subsequent to Oct. 4, 1994, has been disclaimed.
Int. Cl.[2] C08G 18/14
U.S. Cl. 521—171 2 Claims

1. A process for preparing a polyurethane foam which comprises mixing and reacting

(1) providing a mixture containing

(a) a phenol, at least in an amount sufficient to form a complex with an aluminum or iron substance in the mixture;

(b) a non-phenolic active hydrogen compound having 2 to 8 active hydrogens per molecule and having an average molecular weight below about 10,000,

(c) a substance containing aluminum or iron which will form a complex with a phenol (a), and

(d) an organic acid anhydride, at least one of which components (a), (b) and (d) being halogenated,

(2) heating the mixture to a temperature in the range of from about 80° C. to about 250° C., and

(3) oxyalkylating the heated mixture by adding thereto sufficient alkylene oxide having from 2 to 12 carbon atoms to form an oxyalkylated polyol product, with 40 to about 60 parts of a polyarylpolyalkylene polyisocyanate having a functionality of about 2.2 to about 3.3 or of an isocyanate-terminated prepolymer derived from the reaction of a stoichiometric excess of said polyarylpolyalkylene polyisocyanate with said oxyalkylation polyol, 0.2 to about 2 parts of a wetting agent, and 5 to about 30 parts of a blowing agent; wherein the catalyst residues from the

production of polyol (A) are not removed prior to use of said polyol in said foam system.

4,177,336

PREPARATION OF POLYOLEFIN CONTAINING MULTIPLE OLEFINIC UNSATURATION AND CARBOXYLIC ACID GROUPS AND POLYOLEFIN SO PREPARED

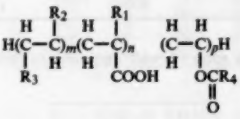
Manfred K. Seven, Long Valley, N.J., and Francis J. Olearczyk, deceased, late of Kenmore, N.Y. (by Jean R. Olearczyk, administratrix), assignors to Allied Chemical Corporation, Morristown, N.J., by said Manfred K. Seven

Filed Dec. 12, 1977, Ser. No. 859,906

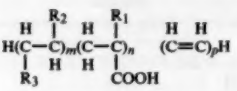
Int. Cl.[2] C08F *6/00, 210/02*

U.S. Cl. 525—325 **24 Claims**

1. A method of producing a polyolefin containing multiple olefinic unsaturation and carboxylic acid groups comprising reacting a terpolymer of the formula



having a number average molecular weight between about 1,000 and about 10,000 wherein m,n and p are integers with the ratio of n to m being on the average between about 0.002:1 and about 0.06:1 and the ratio of p to m being on the average between about 0.003:1 and about 0.065:1, R_1, R_2 and R_3 are each H, methyl or ethyl and R_4 is H or alkyl having 1–5 carbons, in the presence of water at an elevated reaction temperature for a time sufficient to remove substantially all ester groups and to form an unsaturated, carboxylated polyolefin of the formula



wherein m, n, p, R_1, R_2 and R_3 are as described above.

4,177,337

VULCANIZABLE RUBBER COMPOSITIONS AND VULCANIZED RUBBER PREPARED THEREFROM

Masao Onizawa, Ohmiya, Japan, assignor to Sanyo Trading Co., Ltd., Tokyo, Japan

Division of Ser. No. 743,211, Nov. 18, 1976, Pat. No. 4,146,689, which is a division of Ser. No. 625,874, Oct. 24, 1975. This application Feb. 16, 1978, Ser. No. 878,659

Claims priority, application Japan, Oct. 29, 1974, 49-124031; Oct. 2, 1975, 50-118242

Int. Cl.[2] C08F *8/00, 8/08, 8/26, 8/32*

U.S. Cl. 525—331 **12 Claims**

1. A vulcanizable composition comprising bromobutyl rubber, at least one amino acid selected from the group consisting of arginine, lysine, hydroxylysine, ornithine, cystine, asparagine, glutamine and citrulline, and at least one organic peroxide vulcanizing agent, with the proviso that said composition does not contain any zinc oxide or lead oxide.

4,177,338

SEMI-TELECHELIC OLEFINICALLY-UNSATURATED ORGANIC POLYMERS

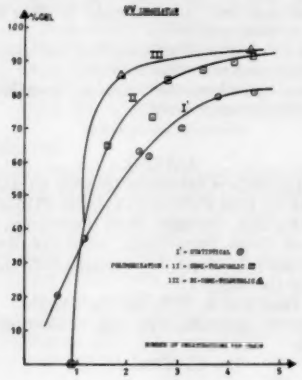
August Vrancken, Dworp, and Paul Dufour, Ruisbroek, both of Belgium, assignors to UCB, Societe Anonyme, Belgium

Filed Oct. 24, 1974, Ser. No. 517,822

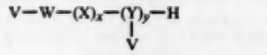
Claims priority, application United Kingdom, Oct. 26, 1973, 49938/73

Int. Cl.[2] C08F *8/14*

U.S. Cl. 526—211 **6 Claims**



1. An organic polymer compound having semi-telechelic olefinic unsaturation, of the formula:



(I)

in which

V is the radical of an organic compound containing at least one polymerizable

group and another group capable of reacting with the functional groups of organic compounds, the radicals of which compounds are represented by W and Y,

W is the radical of β-mercaptoethanol or 1-thioglycerol,

X is the radical of an organic compound containing a polymerizable

group,

Y is the radical of an organic compound containing a polymerizable

group and at least one other reactive group selected from hydroxyl, carboxyl, acid anhydride and epoxy groups,

y is 0 or a whole number of from 1 to 10,

x is the number of moles of X necessary to enable the chain $-(X)_x-(Y)_y-$ to have a molecular weight from 1000 to 10,000 and

H is the hydrogen atom detached from the chain transfer agent RSH, the radical RS of which is represented by W in the above formula, $(X)_x$—$(Y)_y$ being the radical polymerization product of the organic compounds whose radicals are designated X and Y, all of the radicals X and the radicals Y being distributed statistically along the polymer chain —$(X)_x$—$(Y)_y$— in accordance with the polymerization kinetics.

4,177,339

SMOKING TOBACCO COMPOSITIONS

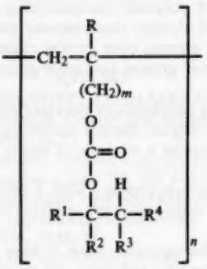
Thomas V. Van Auken, Richmond; Harvey J. Grubbs, Mechanicsville, and William R. Johnson, Jr., Richmond, all of Va., assignors to Philip Morris Incorporated, New York, N.Y.

Division of Ser. No. 739,291, Nov. 5, 1976, Pat. No. 4,092,988. This application Feb. 15, 1978, Ser. No. 877,978

Int. Cl.[2] C08F *118/00*

U.S. Cl. 526—314 **6 Claims**

1. A polymeric carbonate ester composition having a molecular weight in the range between about 500 and 2,000,000 and consisting essentially of recurring monomer units corresponding to the formula:



wherein R is a member selected from the group consisting of hydrogen and aliphatic, alicyclic and aromatic hydrocarbon radicals containing between 1 and about 10 carbon atoms, with the proviso that R is hydrogen when m is zero; R^1 is a member independently selected from the group consisting of unsaturated aliphatic radicals, and alicyclic and aromatic hydrocarbon radicals; R^2, R^3 and R^4 are members independently selected from the group consisting of hydrogen and aliphatic, alicyclic and aromatic hydrocarbon radicals; R^1 and R^3 when taken together with connecting elements form an alicyclic structure, and wherein the total number of carbon atoms in R^1, R^2, R^3 and R^4 collectively does not exceed about 20; m is an integer between 0 and about 8; and n is an integer between 2 and about 10,000.

4,177,340

MANUFACTURE OF HIGH-PRESSURE POLYETHYLENE

Klaus Böettcher; Heinrich G. Hörerdt; Klaus Pfleger; Wieland Zacher, all of Wesseling, and Hans Gropper, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Filed Nov. 30, 1977, Ser. No. 855,896

Claims priority, application Fed. Rep. of Germany, Dec. 18, 1976, 2657475

Int. Cl.[2] C08F *210/02*

U.S. Cl. 526—329 **4 Claims**

1. In a process for the manufacture of an ethylene polymer by polymerizing ethylene in a polymerization zone at pressures of from 1,000 to 4,000 bars and at temperatures of from 100° to 450° C., with a mean residence time of from 30 to 120 seconds, by continuously passing a mixture of ethylene and oxygen, with or without a polymerization regulator, through a polymerization zone, the improvement which consists essentially of

adding to the polymerization mixture from 0.01 to 0.5% by weight, based on ethylene, of an alkyl ester of an alkenemonocarboxylic acid of 3 or 4 carbon atoms, said alkyl moiety containing from 1 to 8 carbon atoms,

passing the polymerization mixture containing the alkenemonocarboxylic acid ester through a preheat zone, whereby ethylene polymerization is initiated at an average effective start temperature of less than 170° C.; and

passing the initiated polymerization mixture to the polymerization zone,

whereby the start temperature of the ethylene polymerization is lowered without changing the properties of the resultant polymer.

4,177,341

ADDITION OF SI-BONDED HYDROGEN TO AN ALIPHATIC MULTIPLE BOND

Gerhard Kreis, Münich; Peter August, Burghausen, and Manfred Wick, Schliersee, all of Fed. Rep. of Germany, assignors to Consortium Für Elektrochemische Industrie GmbH, Münich, Fed. Rep. of Germany

Filed May 24, 1978, Ser. No. 909,094

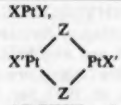
Claims priority, application Fed. Rep. of Germany, Jun. 2, 1977, 2724822

Int. Cl.[2] C08G *77/06*

U.S. Cl. 528—15 **11 Claims**

1. An improved process for effecting the addition of silicon-bonded hydrogen atoms to compounds containing aliphatic multiple bonds in the presence of a platinum catalyst, the improvement which comprises contacting a compound containing at least one silicon-bonded hydrogen atom with a compound containing aliphatic carbon atoms linked by multiple bonds in the presence of a platinum catalyst selected from the group consisting of

I XPtY,

II 

III APt(Y')X'' and

mixtures thereof, in which A is halogen, X is a hydrocarbon radical having from 1 to 3 aliphatic double bonds which is bonded to the platinum atom via a PtC-sigma bond and a Pt-olefin-Pi-bond, X' is a hydrocarbon radical substituted with an alkoxy or acyloxy group and has from 1 to 3 double bonds and is bonded to the platinum atom via a PtC-sigma bond and a Pt-olefin-Pi-bond, X'' is a hydrocarbon having an aliphatic double bond which is bonded to the platinum atom via a Pt-olefin-Pi-bond, Y is a chelated beta-diketonate ligand or arylcarboxylate ligand, Y' is a beta-diketonate ligand and Z is a double link bridge ligand.

4,177,342

PROCESS FOR THE PREPARATION OF POLYISOCYANATES CONTAINING ALLOPHANATE GROUPS

Manfred Bock, Leverkusen; Josef Pedain; Wilhelm Slawyk, both of Cologne, and Klaus Konig, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed May 24, 1978, Ser. No. 909,239

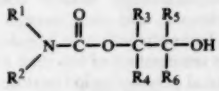
Claims priority, application Fed. Rep. of Germany, Jun. 4, 1977, 2725318

Int. Cl.[2] C08G *18/32, 18/79, 18/80*

U.S. Cl. 528—45 **9 Claims**

1. A process for the preparation of allophanate polyisocyanates having at least three isocyanate groups by the reaction of hydroxyl compounds with excess quantities of organic polyisocyanates which are free from allophanate groups, character-

ized in that the hydroxyl compounds used contain compounds represented by the following formula



wherein

R^1 and R^2 are identical or different and represent hydrogen or hydroxyalkyl, alkyl or cycloalkyl groups wherein at least one of the groups R^1 and R^2 must be hydrogen or a hydroxy alkyl group, and

R_3, R_4, R_5 and R_6 are identical or different and represent hydrogen or alkyl or hydroxy alkyl groups or the groups R_3 and R_5 together with the two carbon atoms may form the basic structure of a cycloaliphatic ring.

4,177,343

PURIFICATION OF POLYMER SOLUTION

Calvin E. Pannell, Walnut Creek, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Filed Dec. 19, 1977, Ser. No. 861,610

Int. Cl.² C08J *3/00*; C08G *63/74, 63/62*

U.S. Cl. 528—482 **8 Claims**

1. A method of removing organic contaminants from a non-aqueous polycarbonate polymer solution containing the same which comprises contacting said polymer solution with a strong acid cation exchange resin effective to remove said contaminants therefrom, and thereafter recovering a purified polymer solution.

4,177,344

ANHYDRO-SUGARS

Gerhard Baschang, Bettingen; Jaroslav Stanek, Birsfelden; Alberto Rossi, Oberwil, and Alex Sele, Muttenz, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

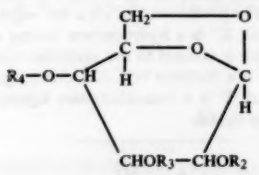
Filed Sep. 16, 1977, Ser. No. 833,795

Claims priority, application Switzerland, Sep. 29, 1976, 12299/76

Int. Cl.² C07H *3/10*

U.S. Cl. 536—4 **7 Claims**

1. 1,6-Anhydro-β-D-hexopyranose derivatives of the formula



(I)

wherein R_2 is hydrogen, methyl, benzoyl, benzoyl substituted by halogen, lower alkyl, lower alkoxy, hydroxy or lower alkanoyl, or naphthoyl, one of the two radicals R_3 and R_4 is lower alkyl, phenyl-methyl, phenyl-methyl substituted by halogen, lower alkyl, lower alkoxy, hydroxy or lower alkanoyloxy, or naphthyl-methyl and the other is lower alkyl, phenyl-methyl, phenyl-methyl substituted by halogen, lower alkyl, lowr alkoxy, hydroxy or lower al[illegible]yloxy, naphthyl-methyl, benzoyl, benzoyl substituted by halogen, lower alkyl, lowr alkoxy, hydroxy or lower alkanoyloxy, or naphthoyl and R_4 can also be hydrogen, with the proviso that the radicals R_3 and R_4 together contain at least 3 carbon atoms, and when R_4 is benzyl, R_3 contains at least 2 carbon atoms, and when one of the radicals R_3 and R_4 is benzoyl, benzoyl substituted as defined above or naphthoyl, R_2 is hydrogen.

4,177,345

PROCESS FOR PREPARING A SULFATE ESTER OF A POLYHYDROXY POLYMER

Richard G. Schweiger, 1324 Rimrock Dr., San Jose, Calif. 95120

Continuation of Ser. No. 786,209, Apr. 11, 1977, Pat. No. 4,143,226, which is a division of Ser. No. 669,483, Mar. 23, 1976, Pat. No. 4,035,569, which is a continuation of Ser. No. 487,196, Jul. 10, 1974, abandoned, which is a continuation-in-part of Ser. No. 298,580, Oct. 18, 1972, abandoned, which is a continuation-in-part of Ser. No. 40,442, May 25, 1970, Pat. No. 3,702,843. This application Aug. 18, 1978, Ser. No. 934,818

The portion of the term of this patent subsequent to Nov. 14, 1989, has been disclaimed.

Int. Cl.² C08B *5/14*

U.S. Cl. 536—59 **8 Claims**

1. A process for preparing a polyhydroxy polymer product which is a polysaccharide or a polyvinyl alcohol that contains a generally uniform distribution of sulfate ester groups and, in addition, also contains ether groups, ester groups other than sulfate, or a mixture of ether groups and ester groups other than sulfate, said process comprising:

reacting a polyhydroxy polymer reactant with sulfur trioxide or a complex thereof at a temperature ranging from about 0° to about 25° C.;

said polyhydroxy polymer reactant being a polysaccharide or a polyvinyl alcohol that contains nitrite ester groups and also ether groups, ester groups other than nitrite, or a mixture of ether groups and ester groups other than nitrite;

said reaction of a polyhydroxy polymer reactant with sulfur trioxide or a complex thereof producing a reaction product which contains a mixture of nitrite and sulfate ester groups;

reacting said reaction product with a protic solvent to remove residual nitrite ester groups from said reaction product, and

then reacting the polymer with a base to neutralize or slightly alkalize the polymer and to obtain said sulfate ester in the form of its salt.

4,177,346

1,5-DISUBSTITUTED-2-PYRROLIDONES

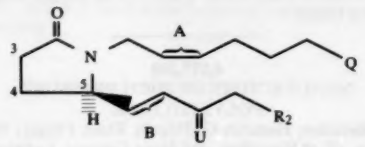
Albin J. Nelson, Westchester, N.Y., assignor to Pfizer Inc., New York, N.Y.

Continuation-in-part of Ser. No. 712,362, Aug. 6, 1976, abandoned. This application Mar. 13, 1978, Ser. No. 885,908

Int. Cl.² C07D *207/00, 403/06*

U.S. Cl. 542—427 **15 Claims**

1. A compound of the structure



wherein:

Q is selected from the group consisting of

tetrazol-5-yl and

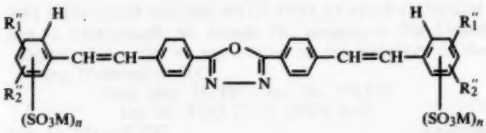
A is a single or cis double bond;

B is a single or trans double bond;
U is H►|||OH HO►|||H or H〰OH,
R_2 is selected from the group consisting of α-thienyl, phenyl, phenoxy, monosubstituted phenyl and monosubstituted phenoxy, said substituents being selected from the group consisting of chloro, fluoro, phenyl, methoxy, trifluoromethyl and alkyl having from one to three carbon atoms;
R_3 is selected from the group consisting of hydrogen, alkyl having from one to five carbon atoms, phenyl and p-biphenyl;
R_4 is selected from the group consisting of

and $-SO_2R_5$, said R_5 being selected from the group consisting of phenyl and alkyl having from one to five carbon atoms;
or the alkali, alkaline earth and ammonium salts of those compounds having a carboxylate or tetrazol-5-yl group.

4,177,347
DISTILBENYL-OXDIAZOLES
Hans R. Meyer, Binningen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.
Continuation of Ser. No. 749,643, Dec. 10, 1976, abandoned, which is a continuation of Ser. No. 585,540, Jun. 10, 1975, abandoned. This application May 23, 1978, Ser. No. 908,600
Claims priority, application Switzerland, Jun. 12, 1974, 8031/74; Jun. 12, 1974, 8038/74
Int. Cl.[2] C07D *271/06*
U.S. Cl. 542—459 **11 Claims**

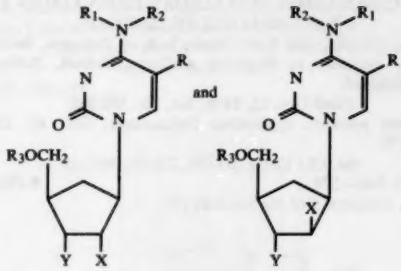
1. A distilbenyl-oxdiazole of the formula



wherein each of
R'_1 is identical and denotes methyl, ethyl, methoxy, chlorine, cyano, caboxyl or carbomethoxy and each of
R'_2 is identical and denotes hydrogen, chlorine, methyl or ethyl,
M denotes a hydrogen ion, alkali metal ion, alkaline earth metal ion, ammonium ion or amine salt ion and n denotes the numbers 1 or 2.

4,177,348
CARBOCYCLIC ANALOGS OF CYTOSINE NUCLEOSIDES
Y. Fulmer Shealy, Birmingham, and C. Allen O'Dell, Fairfield, both of Ala., assignors to United States Government, Washington, D.C.
Filed Dec. 13, 1977, Ser. No. 860,086
Int. Cl.[2] C07D *239/46, 498/04;* A61K *31/505*
U.S. Cl. 544—317 **14 Claims**

1. A compound having a formula selected from the group consisting of

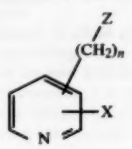


and

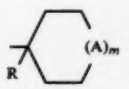
wherein X and Y are hydrogen, hydroxy or benzolyoxy; R is hydrogen, lower alkyl or halogen; R_1 and R_2 are hydrogen or lower alkyl; and R_3 is hydrogen or acyl.

4,177,349
SUBSTITUTED 2,2'-BIPYRIDYL COMPOUNDS AND PROCESS FOR PREPARING SAME
Charles K. McGill, Indianapolis, Ind., assignor to Reilly Tar & Chemical Corporation, Indianapolis, Ind.
Filed Jul. 27, 1978, Ser. No. 928,396
Int. Cl.[2] C07D *213/22*
U.S. Cl. 546—255 **18 Claims**

1. A process for preparing a substituted 2,2'-bipyridyl compound, comprising the steps of:
(a) selecting a singly-substituted alkylpyridine of the formula



wherein:
(1) X is hydrogen or an alkyl group having from 1 to about 9 carbon atoms;
(2) Z is:
(i) a branched chain alkyl group having from 3 to about 20 carbon atoms connecting to $(CH_2)_n$ at a point of branching when n=0, 1, 2; or
(ii) a cyclic structure of the type



when n=0, 1, 2, wherein
(a) A is methylene, oxygen, or sulfur when m=0, 1; and
(b) R is hydrogen or an alkyl group having from 1 to about 4 carbon atoms; or
(iii) a phenyl group when n=1, 2, 3,; and
(3) the 2- or 6-position is occupied by hydrogen; and
(b) mixing a stoichiometric excess of the substituted pyridine with an amount of sodamide, said mixing being in a mole ratio of at least about 2:1;
(c) causing the resultant mixture to be at a temperature sufficiently high to cause substituted 2,2'-bipyridyl formation; and
(d) isolating the substituted 2,2'-bipyridyl formed during said causing.

4,177,350

IMIDAZOLE ETHYL OXYALKOXY DERIVATIVES AND THIO ANALOGUES THEREOF

Ludwig Zirngibl, and Kurt Thiele, both of Zofingen, Switzerland, assignors to Siegfried Aktiengesellschaft, Zofingen, Switzerland

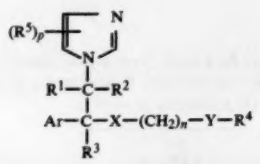
Filed Oct. 12, 1978, Ser. No. 950,825

Claims priority, application Switzerland, Oct. 13, 1977, 12528/77

Int. Cl.[2] **C07D** *233/60, 233/94, 401/12*

U.S. Cl. 546—278 **8 Claims**

1. A compound of the formula (1)



(1)

in which R^1, R^2 and R^3 are individually selected from the group consisting of hydrogen and lower alkyl; R^4 is selected from the group consisting of hydrogen; lower alkyl; C_4–C_8 cycloalkyl or a benzyl or phenyl group having at least one substituent selected from the group consisting of halogen, lower alkyl, lower alkoxy, lower alkylthio, phenyl, cyano, nitro and amino; and unsubstituted and halosubstituted pyridyl; R^5 is selected from the group consisting of nitro and lower alkyl; Ar is selected from the group consisting of unsubstituted and substituted phenyl having at least one substituent selected from the group consisting of halogen, lower alkyl and lower alkoxy; and unsubstituted and substituted benzyl having at least one substituent selected from the group consisting of substituents specified for R^4; X and Y are individually selected from the group consisting of oxygen and sulfur atoms; n is an integer of from 1 to 5 inclusive and p is selected from the group consisting of Zero and integers of from 1 to 3 inclusive provided that p does not exceed 1 where R^5 is nitro; and addition salts of said formula (1) compounds with pharmaceutically acceptable acids.

4,177,351

FLUORINATED HETEROCYCLIC SULFIDES

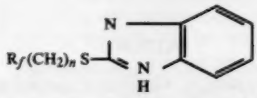
Sameeh S. Toukan, Phoenixville, and Murray Hauptschein, Glenside, both of Pa., assignors to Pennwalt Corporation, Philadelphia, Pa.

Division of Ser. No. 396,649, Sep. 12, 1973, Pat. No. 3,933,819, which is a continuation-in-part of Ser. No. 171,325, Aug. 21, 1971, abandoned. This application Jun. 17, 1975, Ser. No. 587,794

Int. Cl.[2] **C07D** *235/04*

U.S. Cl. 548—325 **4 Claims**

1. A fluorinated alkyl sulfide represented by the structure



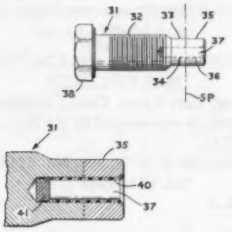
where R_f is selected from the group consisting of perfluoroalkyl, perfluoroisoalkyl and perfluoromonochloralkyl radicals having from 5 to 13 carbon atoms, and n is an integer of 2 or 3.

4,177,352

SHEAR BOLT ASSEMBLY FOR A LOAD LIMITING LINE SUPPORT FOR A POST INSULATOR

David R. Dunbar, Pavilion, N.Y., and Edward J. Balog, Sr., McKeesport, Pa., assignors to Interpace Corporation, Parsippany, N.J.

Filed May 25, 1978, Ser. No. 909,487
Int. Cl.[2] F16B *31/00*; F16D *9/00*; H01B *17/16, 17/38*
U.S. Cl. 174—1 5 Claims



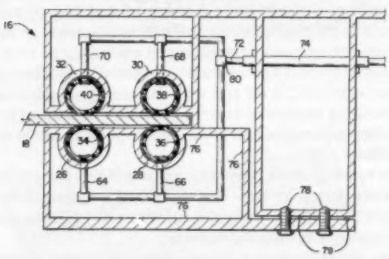
1. A shear bolt assembly for joining two members with a given shear strength capability, said assembly comprising a bolt including a first portion adapted for being engaged by one of the members being joined with given shear capability, said bolt having an axial bore therein extending partially along the length of the bolt, a collar disposed adjacent said bolt and adapted for being engaged by the other of the members to be joined with given shear capability, said collar having an axial bore therein which is aligned with the bore in the bolt with said collar in abutting relation with said bolt along a plane constituting the shear plane of the bolt assembly, a shear pin extending in the axially aligned bores of the bolt and the collar, and adhesive means securing said shear pin in said collar and bolt.

4,177,353

RFI SHIELDED DOORS WITH INFLATABLE GASKETS

Ray G. McCormack, St. Joseph, Ill., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 18, 1977, Ser. No. 778,911
Int. Cl.[2] F16J *15/46*; H05K *9/00*
U.S. Cl. 174—35 GC 2 Claims



1. In combination, a shielded enclosure having a cooperating door and door frame; and

a gasket structure, comprising:

a flexible inflatable tube made from an electrically conductive elastomeric material and fixedly mounted about the entire periphery of the door frame such that it is between the door and the door frame when the door is closed; and

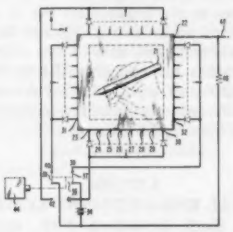
means for inflating said tube thereby causing said tube to make continuous electrical contact with both the door and the door frame when the door is closed.

4,177,354

GRAPHIC COMMUNICATIONS APPARATUS

Max V. Mathews, New Providence, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 17, 1978, Ser. No. 896,705
Int. Cl.[2] G08C *21/00*
U.S. Cl. 178—18 9 Claims



4. In combination in a system for providing electrical signals representative of the successive coordinate positions of a writing stylus and for providing a visual display of graphical information written by said stylus,

a transducer device adapted to be activated by a light-spot-emitting stylus, said device comprising

a photoconductive layer sandwiched between a transparent conductive layer and a resistive layer,

an output terminal electrically connected to said conductive layer,

multiple spaced-apart terminals electrically connected to said resistive layer along the periphery thereof,

and means connected to said spaced-apart terminals for successively applying x- and y-direction potentials to said resistive layer,

a display unit positioned in close proximity to said transducer device for providing a visual display of graphical information written by said stylus on said device,

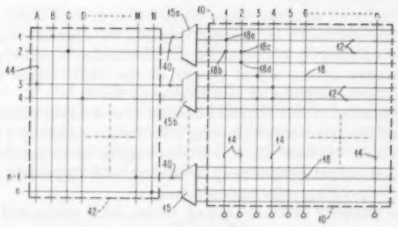
and a processing unit connected to said output terminal for storing coordinate-position signals provided by said device and for applying said signals to said display unit.

4,177,355

ARRAY DEVICE FOR DATA SCRAMBLING

Harold Fleisher, and Se J. Hong, both of Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 24, 1975, Ser. No. 571,116
Int. Cl.[2] H04K *1/06*
U.S. Cl. 178—22 5 Claims



1. Apparatus for enciphering and deciphering a block of n data bits comprising;

a matrix of crossing input and output lines,

decoders each addressing a different group of the input lines,

grouping means for dividing the message to be enciphered or deciphered into m sets of n/m bits each and addressing each of the decoders with one set of bits,

said grouping means including a second matrix of crossing

input and output lines each of input lines being adapted to receive one of the n data bits and each output line being connected to one of the inputs of one of the decoders,

means at certain of the crossings of said second matrix to couple certain of the input lines to certain of the output lines to thereby generate the m sets,

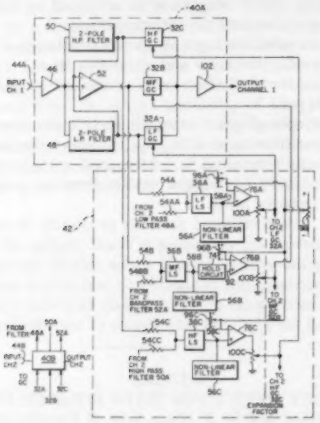
substitution means for selectively connecting each group of input lines to at least m output lines at certain crossings of the input lines in the group with the m output lines to substitute coded digits for the digits in the original message to encode messages, and,

transposition means for changing the m output lines to which any group of input lines are connected to place digits in a different location in the encoded message than they were in the original message.

4,177,356
SIGNAL ENHANCEMENT SYSTEM

C. Rene Jaeger, South Lyndeboro, N.H., and Lawrence E. Blakely, Framingham, Mass., assignors to DBX Inc., Newton, Mass.

Filed Oct. 20, 1977, Ser. No. 843,949
Int. Cl.[2] H03G *3/00*; H04R *25/00*
U.S. Cl. 179—1 VL **12 Claims**



1. A system for enhancing the sound quality and dynamics of an audio signal having substantially all of its signal energy divided among a plurality of substantially discrete frequency bands, said system comprising;

an input terminal for receiving said audio signal;

an output terminal;

a plurality of separate signal paths between said input and output terminals for respectively and substantially mutually exclusively transmitting an information signal representative of the signal energy of the audio signal in a corresponding one of said frequency bands,

amplification means disposed in each of said signal paths for amplifying the corresponding information signal by a gain variable responsively to a control signal as to provide a signal output dynamically expanded with respect to said corresponding information signal;

a like plurality of level sensing means each connected between a corresponding one of said amplification means and a selected point in the respective signal path for sensing at said point the amplitudes of signals transmitted through the respective signal path and for providing responsively thereto said control signal as a logarithmic function of the amplitude of the sensed signals;

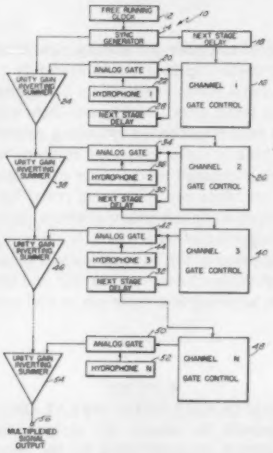
means for providing a signal to said output terminal as a function of the sum of said signal outputs of all of said amplification means; and

filtering means, coupled to the output of each of said level sensing means, for modifying said control signal nonlinearly with respect to the rate of change of the output of said level sensing means so as to allow relatively long smoothing constants to be applied to said control signal when the output of said level sensing means is a steady state or relatively slowly-varying signal, and so as to allow a relatively rapidly-varying signal at the output of said level sensing means to effect a relatively rapid change in said control signal.

4,177,357
SPATIALLY DISTRIBUTED ANALOG TIME DIVISION MULTIPLEXER

Gerald M. Mayer, East Lyme, Conn., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 3, 1978, Ser. No. 921,404
Int. Cl.[2] H04J *3/04*
U.S. Cl. 179—15 A **9 Claims**



1. An analog time division multiplexer system for transmitting analog signals from a first plurality of spatially distributed sensors of a multi-sensor array which comprises:

multiplexing means including a second plurality of channels, each member of said second plurality of channels corresponding to a respective member of said first plurality of spatially distributed sensors of said multi-sensor array, said multiplexing means combining an analog signal from each member of said first plurality of spatially distributed sensors with a DC level and with the analog signals from the preceding sensors of said first plurality of sensors to form a composite signal and inverting the polarity of the combination;

a free running clock providing an output thereof and having a time period longer than the time for sequentially sampling the outputs of various members of said first plurality of spatially distributed sensors;

a sync generator being triggered by the output of said free running clock, said sync generator producing an output thereof for use as a starting reference in said multiplexing means for a new sequence of multiplexed signals from said first plurality of spatially distributed sensors of said multi-sensor array;

transmission means for transmitting said composite signals to a remote receiving station; and

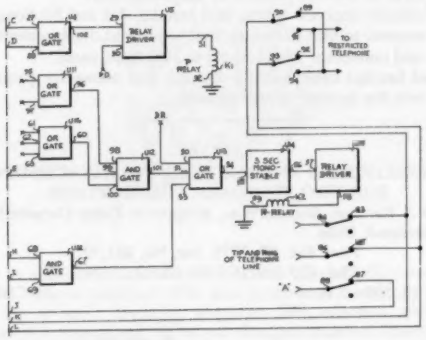
demultiplexing means including a third plurality of channels having each member thereof corresponding to a respective member of said first plurality of said spatially distributed sensors and a respective member of said second

plurality of channels of said multiplexing means, said demultiplexing means decomposing said composite signal into the components thereof at said receiving station.

4,177,358
TONE DIAL TOLL RESTRICTOR

John W. Mason, Rte. 1, Box 153, Wirtz, Va. 24184

Continuation of Ser. No. 716,035, Sep. 9, 1976, abandoned, which is a continuation of Ser. No. 506,553, Sep. 16, 1974, abandoned. This application Jun. 21, 1978, Ser. No. 917,760
Int. Cl.[2] H04M 1/66
U.S. Cl. 179—18 DA 6 Claims

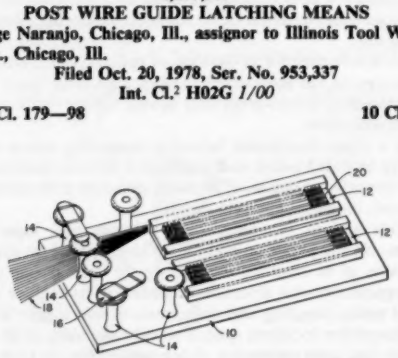


1. In a dual tone multi-frequency telephone system including a toll restrictor circuit, enabled by the initiation of a telephone call, for monitoring numbers dialed from a telephone connected to a telephone line and for disconnecting the telephone from the telephone line when a restricted number is dialed, the improvement comprising polarity-reversal means coupled to the telephone line for normally disabling the telephone dial by applying an original line voltage polarity to the telephone, and dial tone detector means, coupled between said polarity reversal means and the telephone line, and responsive to the presence of a dial tone for reversing the polarity of the telephone line connected to the telephone, enabling the telephone dial, and permitting dialed number signals to reach the connected telephone line.

4,177,359
POST WIRE GUIDE LATCHING MEANS

George Naranjo, Chicago, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Oct. 20, 1978, Ser. No. 953,337
Int. Cl.[2] H02G 1/00
U.S. Cl. 179—98 10 Claims

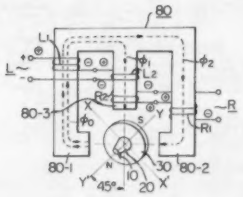


1. A post wire guide latching means adapted for use with a post wire guide, said post having an elongated tubular body for mounting on a support at one end of said body and terminating at the opposite end with a circumferentially disposed laterally extending flange means forming a head having a bore that extends longitudinally through said head into said body, said latching means including an elongated element for mounting on said head, said element including means for positioning said element relative to said bore and means for engaging the free edge of said flange whereby said element can be rotated relative to said head to overlie the head of an adjacently positioned post to thereby capture wires guided and positioned between said posts.

4,177,360
MOVING MAGNET TYPE PICKUP CARTRIDGE

Yasuhiro Fujimoto, and Masao Suzuki, both of Tokyo, Japan, assignors to Sansui Electric Co., Ltd., Tokyo, Japan

Filed Jul. 27, 1977, Ser. No. 819,282
Claims priority, application Japan, Jul. 31, 1976, 51-91867; Jul. 31, 1976, 51-91868; Jun. 7, 1977, 52-67509
Int. Cl.[2] H04R 11/12
U.S. Cl. 179—100.41 M 12 Claims



1. A pickup cartridge of the moving magnet type, comprising

(a) a stationary yoke having at least three leg portions;

(b) an armature;

(c) means including a tiltably and oscillatably movable cantilever connected at one end with said armature for normally supporting said armature in a static position adjacent said yoke leg portions, said yoke leg portions being disposed in a plane normal to the axis of said cantilever when in the static position, a pair of said yoke leg portions comprising side leg portions arranged on left and right sides of said armature, respectively, the remaining yoke leg portions being arranged solely above said armature, whereby the area beneath said armature is open;

(d) a phonograph needle connected with the other end of said cantilever for tilting and oscillating the same;

(e) a pair of first coil means wound on said side leg portions, respectively, to provide channel signals in accordance with the inclination and oscillation of said armature based on oscillation applied to said phonograph needle; and

(f) a pair of second coil means electrically connected with said first coil means, respectively, said second coil means being wound on those leg portions of said yoke arranged between said yoke side leg portions in such a manner as to cancel the voltages induced in one yoke side leg portion when the cantilever is tilted in one direction from said static position;

(g) the end portions of said side leg portions adjacent said armature being disposed so that variation of magnetic flux, except that corresponding to inclination and oscillation of the armature based on oscillation applied to the phonograph needle, is cancelled magnetically.

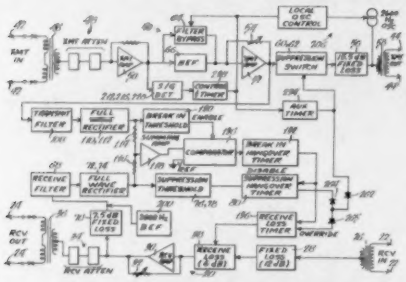
4,177,361
SIGNALING TONE TRANSPARENT ECHO SUPPRESSOR

Michael J. Birck, Hinsdale, Ill., assignor to Tellabs, Inc., Lisle, Ill.

Filed Dec. 14, 1977, Ser. No. 860,160
Int. Cl.[2] H04B 3/20
U.S. Cl. 179—170.2 24 Claims

1. In an echo suppressor for telephone systems having separate transmit and receive channels on which signaling tone is at

least occasionally present, an attenuation pad for the receive channel; means coupled with the transmit channel and said attenuation pad for detecting the level of energy on the transmit channel and for controlling operation of said attenuation pad to insert and remove attenuation into and from the receive channel in accordance with the energy level being greater than or less than, respectively, selected levels; an attenuation pad for the transmit channel, means coupled with the receive channel and said transmit channel attenuation pad for detecting the level of energy on the receive channel and for controlling operation of said transmit channel attenuation pad to insert and remove attenuation into and from the transmit channel at a point subsequent to the point whereat the energy on the transmit channel is detected in accordance with the receive channel energy level being greater than or less than, respectively,



selected levels; means coupled with the transmit channel for removing signaling tone therefrom prior to said detecting means and said transmit channel attenuation pad, said removing means including signaling tone blocking means for the transmit channel, said blocking means having an active state in which signaling tone is removed from the transmit channel and an inactive state in which it is not; means for sensing the presence or absence of signaling tone on the transmit channel and for controlling operation of said blocking means to place the same in its active and inactive states, respectively, in accordance therewith; and means coupled with the transmit channel for generating signaling tone thereon subsequent to said transmit channel attenuation pad whenever said blocking means is removing signaling tone, so that said echo suppressor does not interfere with signaling tone on the transmit channel and signaling tone does not affect operation of said detecting means.

4,177,362

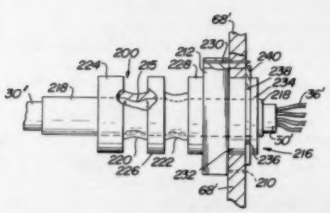
TAMPERPROOF HANDSET CONNECTOR ARRANGEMENT FOR RAILROAD APPLICATIONS

Charles A. Boenecke, 1 Capshire Dr., Cherry Hill, N.J. 08003

Continuation-in-part of Ser. No. 760,877, Jan. 21, 1977, Pat. No. 4,087,659. This application Apr. 13, 1978, Ser. No. 896,072

Int. Cl.[2] H04M *1/15*

U.S. Cl. 179—186 **2 Claims**



1. A tamperproof handset connector arrangement for installation in a railroad communication control having a housing provided with a front panel which has a hole and plural apertures spaced from the hole, the handset having a cable and a plurality of wires disposed within said cable for electrically connecting said control and handset, said connector arrangement comprising:

a connector having a flange, a swaged section disposed on one side of said flange, and a slotted section having an annular slot disposed on the other side of said flange,

said flange having a locating pin projecting therefrom on said slotted section side,

said connector having a passage extending therethrough,

said flange being substantially flush with the outer surface of said housing front panel and said slotted section extending through said panel hole into said housing,

said locating pin extending through one of said spaced apertures to prevent rotation of said connector,

a retainer disposed within said annular slot and frictionally secured to said slotted section to prevent displacement of said connector with respect to said front panel,

said handset cable passing through said connector passage into the interior of said housing.

4,177,363

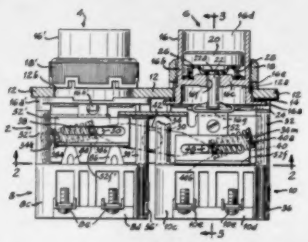
INTERLOCKING AND MAINTAINING ATTACHMENT FOR TWO STANDARD PUSHBUTTONS

John J. Keranen, Sussex, Wis., assignor to Eaton Corporation, Cleveland, Ohio

Filed Feb. 27, 1978, Ser. No. 881,797

Int. Cl.[2] H01H *9/00*; G05G *11/00*

U.S. Cl. 200—5 B **15 Claims**



1. An interlocking and maintaining attachment for two standard pushbutton devices of the type having a shaft-mounted pushbutton vertically reciprocable in a retaining ring with a standard push-plate secured to the lower end of the shaft and the pushbutton devices being mounted by their retaining rings in spaced apart relation on a common supporting member, comprising:

push-levers attached at their upper ends to respective push-plates on the pushbutton devices with their lower ends extending downwardly and having means for actuating driven units;

and a toggle mechanism including supporting means therefor mounted below said pushbutton devices comprising:

an elongated toggle lever pivotally mounted intermediate its ends on said supporting means;

toggle springs in compression between said supporting means and points on said toggle lever spaced on opposite sides of its pivot biasing said toggle lever in one or the opposite pivotal direction according to its angular state;

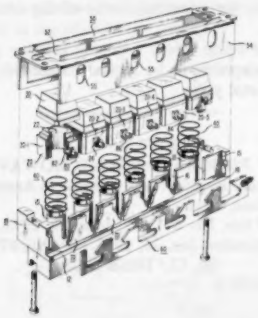
and means coupling said push-levers to said toggle lever at respective locations spaced on opposite sides of its pivot so that upon depression of one pushbutton, its push-lever drives the corresponding side of the toggle mechanism downwardly across its overcenter line of action whereupon said toggle mechanism snaps to its limit of downward motion carrying the corresponding push-lever and pushbutton with it while the other side of the toggle mechanism raises the other pushbutton, and said toggle mechanism thereafter maintains the pushbuttons in their respective down and up states.

4,177,364

MULTIPLE PUSHBUTTON SWITCH

Robert L. Beecher, II, and Harold J. Hershey, both of Indianapolis, Ind., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 23, 1978, Ser. No. 889,497
Int. Cl.[2] H01H 9/26
U.S. Cl. 200—5 B 6 Claims



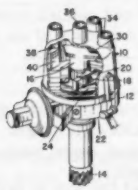
1. A multiple pushbutton switch of the type including one or more lockout members (70) and pushbutton actuators (20) having lockout engaging elements (80) attached thereto adapted to engage and displace the lockout members when one or more of the actuators is depressed, the interaction between the lockout engaging elements of the lockout members limiting the simultaneous depression of the actuators, characterized in that the lockout engaging elements comprise cams (86) rotatably oriented by adjustment among a plurality of positions, each cam in a first position of rotation oriented adjacent to a particular lockout member, being engageable with that lockout member when the associated actuator is depressed and each cam oriented in a second position of rotation not being engageable with the particular adjacent lockout member when the associated actuator is depressed.

4,177,365

MOISTURE REDUCER FOR USE IN HEATED AND VENTED CONTAINER INCLUDING ELECTRICAL CONTACTS

Stanley J. Blackman, Brockton YMCA, Brockton, Mass. 02401

Continuation-in-part of Ser. No. 803,760, Jun. 6, 1977, abandoned, which is a continuation-in-part of Ser. No. 755,017, Dec. 28, 1976, abandoned. This application Jan. 25, 1978, Ser. No. 872,071
Int. Cl.[2] H01H 19/00; B65D 81/26; C09K 3/00
U.S. Cl. 200—19 R 7 Claims



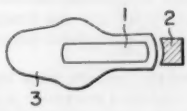
1. The combination of an article of manufacture and a means of heating same, the article comprising a distributor for an internal combustion engine and a moldable, regenerative desiccant, the distributor including electric switch elements, a cap and a housing, the cap and housing engaged to each other defining a chamber and each having an internal surface, the cap and housing having an external environment outside the cap and housing, the electric switch elements in spaced relation to the desiccant, the chamber vented to the external environment, the desiccant cast in place totally within the chamber forming a solid structure and having a surface exposed to the chamber.

4,177,366

NOISE SUPPRESSION ELECTRODE ARRANGEMENT WITH A ROTOR OF DIELECTRIC MATERIAL

Kazuhiro Kozuka; Shin Yamamoto; Mikio Huruhashi, all of Nagoya; Katsutaro Iwaki, Chiryu, and Susumu Asari, Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya and Kabushiki Kaisha Toyota Chuo Kenkyusho, Nagoya, both of, Japan

Filed Jan. 4, 1978, Ser. No. 867,184
Claims priority, application Japan, Jan. 19, 1977, 52-5164
Int. Cl.[2] H01H 19/00; F02P 7/00; H01H 1/00
U.S. Cl. 200—19 DR 5 Claims



1. A noise suppression electrode arrangement for suppressing noise associated with an electrical discharge between a movable electrode mounted on a rotor and a stationary counterelectrode positioned in spaced relationship with respect to said rotor, said arrangement being characterized by:

the rotor including a turn table made of dielectric material; and

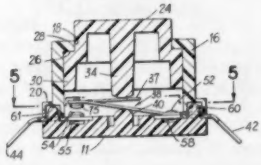
said electrode being mounted on the turn table such that as the electrode passes the counterelectrode during rotation of said rotor, the edge of said electrode nearest to the counterelectrode is located a distance of 0.7 to 3 mm from the edge of the turn table closest to the counterelectrode.

4,177,367

PUSH BUTTON SWITCH

Stephen A. Tirone, Boca Raton, and Ronald H. Arthur, Lauderhill, both of Fla., assignors to AMF Incorporated, White Plains, N.Y.

Filed Jul. 18, 1978, Ser. No. 925,675
Int. Cl.[2] H01H 9/00
U.S. Cl. 200—159 A 5 Claims



1. A push button switch comprising

a base of electrical insulating material,

a hollow cylindrical housing of electrical insulating material having an open bottom,

latching means extending from the bottom of said housing,

means in said base for releasably receiving said latching means for holding the housing in contact with the base, thereby to provide an enclosed region between the base and housing,

first and second substantially identical electrical terminals extending laterally from the interior to the exterior of said enclosed region at respective spaced locations about said housing,

first and second recesses in the top surface of said base proximate said spaced locations, said recesses being complementary in shape to the interior portions of said terminals for receiving respective ones of said terminal portions therein,

first and second projections extending upwardly from the surface of said base at the respective locations where the two terminals are located and in registration with the bottom edge of the housing,

an aperture in each of said terminals for receiving a respective one of said projections, thereby to locate said terminals on said base,

an elongated spring member of electrical conducting material having an aperture at one end in engagement with a respective one of said projections and in engagement with a respective one of said terminals,

said spring member extending inwardly within a said enclosed region and having its inner end overlaying but spaced from said first terminal,

first and second contacts respectively secured to said first terminal and said spring member and located to engage each other when the spring member is moved toward the first terminal,

one or more tabs extending upwardly from the end of said spring member that engages a respective projection,

first and second recesses in the bottom edge of said housing for receiving respective ones of said projections,

additional recesses in the bottom edge of the housing for receiving said one or more tabs and for providing clearance for said first end of the spring member,

actuator means on said housing member for engaging the spring member to move the second contact into engagement with the first contact,

said spring member urging the actuator away from the first terminal in the absence of a force being applied to the actuator.

4,177,368

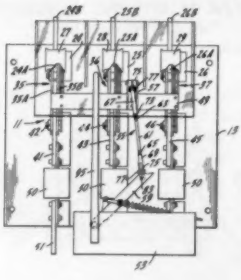
SWITCH OPERATING ROD ASSEMBLY

James A. Erickson, Crystal Lake, Ill., assignor to Boltswitch, Inc., Crystal Lake, Ill.

Filed Jul. 17, 1978, Ser. No. 924,943

Int. Cl.[2] H01H *3/02*

U.S. Cl. 200—332 **3 Claims**



1. In a high-current, low-voltage, load-break switch, of a kind comprising a fixed contact, a movable contact movable between a closed position in bolted pressure contact with the fixed contact and an open position displaced from the fixed contact, a switch-operator mechanism, including an operating lever, for rapidly opening and closing the switch by driving the movable contact between its closed position and its open position, and an electrically non-conductive operating rod assembly interconnecting the movable switch contact and the switch-operator mechanism, an improved operating rod assembly construction comprising:

a metal rod, threaded at its opposite ends;

two metal yokes, threaded onto the opposite ends of the metal rod to permit effective adjustment of the length of the operating rod assembly;

an insulator link, of molded high-strength dielectric material, pivotally mounted on one yoke at the end of that yoke opposite the rod to complete the operating rod assembly with a metal yoke at one end and the insulator link at the other;

and pivotal connecting means for pivotally connecting one end of the assembly to the movable switch contact and the other end to the operating lever of the switch-operator mechanism,

said metal rod being freely rotatable relative to one metal yoke and adaptable to be locked rotationally relative to the other metal yoke.

4,177,369

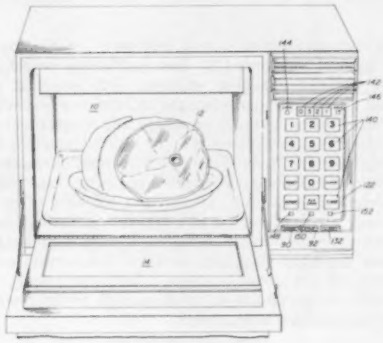
DIGITALLY PROGRAMMED MICROWAVE OVEN

Rex E. Fritts, Cedar Rapids, Iowa, assignor to Amana Refrigeration, Inc., Amana, Iowa

Continuation of Ser. No. 671,527, Mar. 29, 1976, abandoned. This application Jan. 26, 1978, Ser. No. 872,719

Int. Cl.[2] H05B *9/06*

U.S. Cl. 219—10.55 B **10 Claims**



1. A microwave heating system comprising:

means comprising a microwave generator energized by a power supply comprising a saturable transformer for supplying microwave energy to a multimode cavity having a movable closure member;

a control system for connecting a source of alternating current power to said power supply transformer at a first predetermined phase of said alternating current;

disconnecting said alternating current power from said transformer at a second predetermined phase of said alternating current power which is opposite in polarity to the polarity of said first phase; and

the clock frequency of said control system being substantially higher than the frequency of the power source.

4,177,370

VARIABLE COOKING MODE SELECTOR IN A MICROWAVE OVEN

Akira Otani, Yamatokoriyama, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 767,149, Feb. 9, 1977, abandoned. This application May 25, 1978, Ser. No. 909,569

Claims priority, application Japan, Feb. 13, 1976, 51/15353; Feb. 13, 1976, 51/15354

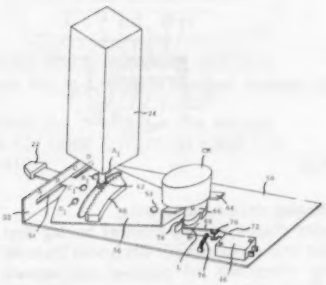
Int. Cl.[2] H05B *9/06*

U.S. Cl. 219—10.55 B **14 Claims**

1. A variable cooking mode selector for a microwave oven comprising:

a first supporting means disposed in a microwave oven housing;

a second supporting means movably mounted on the first supporting means;
a cam motor mounted on the second supporting means;
a cam plate fixed to a cam motor shaft of said cam motor, the cam plate having a periphery divided into plural sections of different radiuses, each of said sections providing a different repetition rate of energization of a magnetron employed in said microwave oven;
a switching means mounted on the first supporting means, said switching means functioning to energize a magnetron employed in the microwave oven;



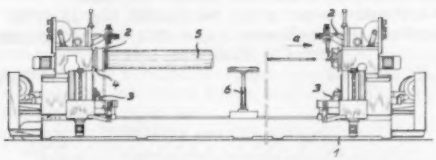
an actuator lever associated with said switching means for closing or opening said switching means in response to the revolution of a selected section of said cam plate; and
control means fixed to said second supporting means for selecting the section of said cam plate which controls said actuator lever;
whereby a repetition rate of the magnetron energization is varied through the use of said control means to implement selected cooking modes.

4,177,371

WELDING MACHINE FOR WELDING PRE-WELD FLANGES AND SLIP-ON FLANGES ONTO PIPES

Helmut Honig, Netphen, Fed. Rep. of Germany, assignor to Deuzer Maschinenfabrik GmbH, Netphen, Fed. Rep. of Germany

Filed Apr. 14, 1977, Ser. No. 787,621
Claims priority, application Fed. Rep. of Germany, Apr. 17, 1976, 2617061
Int. Cl.² B23K *31/00*
U.S. Cl. 219—59.1 **2 Claims**



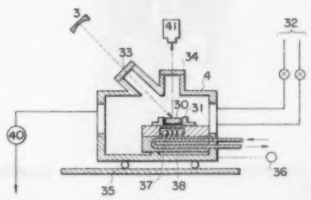
1. A welding machine for welding preweld flanges and slip-on flanges onto pipes, which includes an upper welding station for welding a flange onto a pipe from the outside thereof, a second welding station for welding a flange onto a pipe from the inner side thereof, a stand common to both said upper welding station and said inner welding station and supporting said two welding stations as a unit, and fluid operable supporting means operable to engage about the central portion of a pipe to which a flange has to be welded and to lower such pipe from said upper welding station to said lower welding station and to lift said pipe from said lower welding station to said upper welding station, said fluid operable supporting means being connected to said stand.

4,177,372

METHOD AND APPARATUS FOR LASER ZONE MELTING

Nobuo Kotera, Kokubunji, Japan; Tetsu Oi, Waltham, Mass., and Takashi Nishida, Tokyo, Japan, assignors to Hitachi, Ltd., Japan

Filed May 24, 1977, Ser. No. 799,928
Claims priority, application Japan, May 26, 1976, 51-60012
Int. Cl.² B23K *9/00*
U.S. Cl. 219—121 L **20 Claims**



1. A laser zone melting method, wherein zone melting of a thin film is performed by irradiating with a laser beam and moving the laser beam relative to the thin film, in a moving direction, comprising the steps of (i) sufficiently elongating said laser beam in the direction substantially perpendicular to the moving direction of the melting zone so that the length of the beam, perpendicular to the moving direction of the melting zone, covers the width, in the direction perpendicular to said moving direction, of the thin film, and (ii) irradiating the thin film by the elongated laser beam while oscillatorily deflecting the elongated beam in a direction substantially perpendicular to the moving direction, with the peak-to-peak amplitude of the oscillation being approximately the width of the thin film in the direction perpendicular to the moving direction, and relatively moving the region irradiated by the laser beam from a first end to a second end of the thin film.

4,177,373

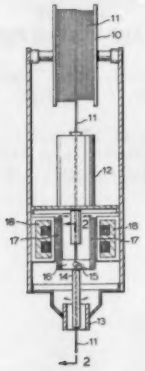
OSCILLATING ARC WELDING

Richard A. Roen, Edmonton, Canada, assignor to The Research Council of Alberta, Edmonton, Canada

Filed Apr. 10, 1978, Ser. No. 895,266
Claims priority, application United Kingdom, Aug. 3, 1977, 32626/77
Int. Cl.² B23K *9/02*
U.S. Cl. 219—125.12 **6 Claims**

1. In a process for making a weld in a gap between the walls of two pieces of metal to be welded together wherein a consumable electrode having a free end is moved through a welding torch and then into said gap, while, on the one hand said two pieces of metal and, on the other hand, said welding torch are moved relative to each other, thereby to move said welding torch along said gap or vice versa, sufficient potential is applied between said two pieces of metal and said consumable electrode to strike an arc therebetween which melts said consumable electrode and at least a part of said walls of said two pieces of metal, and said consumable electrode is oscillated back and forth across said gap, the improvement wherein the frequency of oscillation of said consumable electrode is at least 6 Hz, during the making of the weld said free end of said consumable electrode is maintained in said gap and at the ends of each half cycle of oscillation of said consumable electrode an impact force is applied to said consumable electrode to interrupt its movement towards the one wall of said metal pieces towards which said consumable electrode was moving before application of said impact force and immediately after the application of said impact force said consumable electrode

is moved away from said one wall and towards the opposite wall of said metal pieces, thereby causing molten metal at said



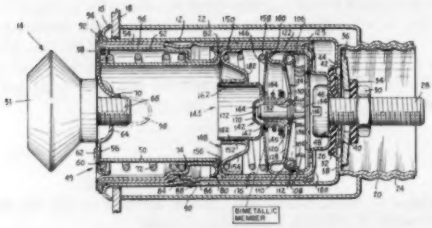
free end of said consumable electrode to be impelled against said one wall.

4,177,374

AUTOMATIC ELECTRIC CIGAR LIGHTER

Laurence G. Horwitt, New Haven, and Donald J. Mattis, Norwalk, both of Conn., assignors to Sun Chemical Corporation, New York, N.Y.

Filed Jan. 31, 1978, Ser. No. 873,771
Int. Cl.[2] F23Q *7/24*
U.S. Cl. 219—265 **27 Claims**



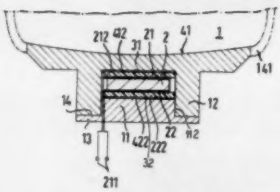
1. An automatic cigar lighter, comprising in combination:
(a) a holder device including a socket having two contacts forming part of a cigar lighter circuit,
(b) an ignitor plug receivable in the socket, said plug having a manually operable part,
(c) a heating element carried at the inner end of the plug,
(d) means for establishing a circuit from the holder device contacts through the heating element, said means including an electrical switch having cooperable parts carried by the ignitor plug,
(e) means for closing said switch to energize said heating element in response to actuation of said manually operable part, and
(f) means responsive to heating of said heating element, for opening said switch to de-energize the element, said means including a bimetallic member constituted solely of a bimetal sheet which is carried by said plug and is adapted to be connected in circuit with said heating element, said member having a circuit-opening position and a closed-circuit position, said sheet further having a bimetallic actuator portion which is free and clear of permanent attachment to said switch and to any other parts, said actuator portion being disposed for electrical contact with and for abutting engagement with one of the cooperable parts of said switch to effect said opening of the switch.

4,177,375

HEATING DEVICE HAVING AN OPTIMIZED HEATING ELEMENT OF PTC THERMISTOR MATERIAL

Hans Meixner, Haar, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Sep. 28, 1978, Ser. No. 946,634
Claims priority, application Fed. Rep. of Germany, Sep. 29, 1977, 2743880
Int. Cl.[2] F27D *11/02*
U.S. Cl. 219—441 **10 Claims**



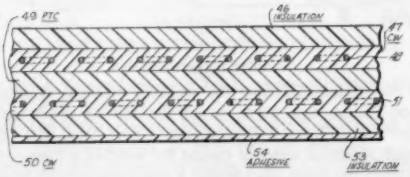
1. A heating device, comprising:
(a) a disc-shaped heating element having first and second major heat surfaces with electrodes thereon, the element being comprised of positive temperature coefficient (PTC) thermistor material;
(b) network voltage means electrically connected to said electrodes for operating the heating element;
(c) said PTC thermistor material having a cut-off control property at a desired cut-off temperature;
(d) the heating element having a thickness from 0.5 to 2 mm when the network voltage is 220 volts;
(e) a specific electrical impedance of the heating element, at Curie temperature and 2000 volt/cm being between $\rho c = 1 \times 10^3$ Ohm-cm and 6×10^3 Ohm-cm;
(f) the heating element having a specific heat output of greater than 50 watts per cm^2 of a cross-section of the disc-shaped element;
(g) the PTC thermistor material being selected to have a Curie temperature which is at least 50° K. higher than the cut-off temperature; and
(h) means for providing a substantially even dissipation of heat from the first and second major surfaces of the heating element.

4,177,376

LAYERED SELF-REGULATING HEATING ARTICLE

David A. Horsma, Palo Alto; Bernard J. Lyons, Atherton, and Robert Smith-Johannsen, Portola Valley, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 510,036, Sep. 27, 1974, abandoned. This application Aug. 4, 1975, Ser. No. 601,638
Int. Cl.[2] H05B *3/12, 3/38*
U.S. Cl. 219—553 **46 Claims**



1. A self-regulating electrical heating article adapted for connection to a source of electrical power comprising a first layer of material, said first layer exhibiting a positive temperature coefficient of resistance with an associated anomaly temperature T_s and having at least partially contiguous therewith a second layer of constant wattage material having an associ-

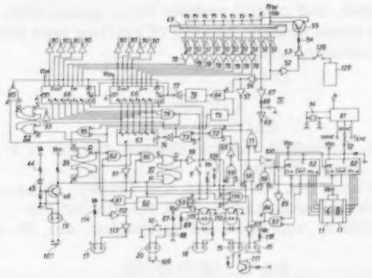
ated resistance, said article being connectable to an electric power input source whereby current flow is through at least a portion of said first layer and through at least a portion of said second layer, whereby there is both direct electrical and thermal coupling between said first and second layers, and whereby at a temperature which is the higher of the temperature at which the resistance of said first layer exceeds the resistance of said second layer or the anomaly temperature of said first layer, current flow predominantly follows the directionally shortest path through said first layer, said article having at least one electrical insulating layer contiguous with a surface of the first or of the second layer which is not adjacent to the other layer.

4,177,377

SEQUENCE CONTROL SYSTEM

Yoshikazu Kuze, No. 31-3, Higashi Magome 1-chome, Ota-ku, Japan

Filed Aug. 7, 1978, Ser. No. 931,552
Int. Cl.[2] G06K *7/14, 19/06;* H04B *1/06*
U.S. Cl. 235—419 **24 Claims**



1. A sequence control system comprising a transparent program sheet bearing a series of write clock marks and a plurality of data lines which are formed of opaque material and arranged in the longitudinal direction of said sheet,

a sheet reading device;

said sheet reading device comprising;

means for passing said sheet along a path,

a plurality of light-emitting elements disposed in the lateral direction at the entrance of said path, and

a plurality of light-receiving elements each of which is corresponding to each of said light-emitting elements and arranged to generate data when light from the corresponding light-emitting element is interrupted by said write clock marks and data lines of said sheet,

memory means for memorizing said data in synchronization with said write clock marks:

means for generating read clock pulse for reading said data;

means including a binary counter for actuating said memory means to cause it to generate output signals in accordance with said data memorized therein in synchronization with said read clock pulse, and

gate means for controlling said data and pulse.

4,177,378

LONG-LIVED REFERENCE CELL SIMULATING THE α SCINTILLATION OF RADON-222

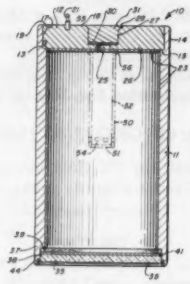
William M. Stevens, Loveland, Ohio, assignor to Randam Electronics, Inc., Cincinnati, Ohio

Filed Apr. 24, 1978, Ser. No. 899,329
Int. Cl.[2] G01D *18/00*
U.S. Cl. 250—252 **51 Claims**

1. A reference cell simulating the light spectrum of an alpha scintillation cell containing radon[222] for the purpose of calibrating electronic equipment detecting scintillations resulting from the radioactive decay of radon[222], said cell comprising:

(A) a normally closed gas-tight container formed at least partially from a substantially transparent gas-impermeable section of material;

(B) a luminescent material adhered to the inside of a first portion of said container, said luminescent material not adhering to the inside of a second portion of said container, said second portion including at least a part of said transparent section of material; and



(C) supply means within said container for generating

(i) radon[222]; and

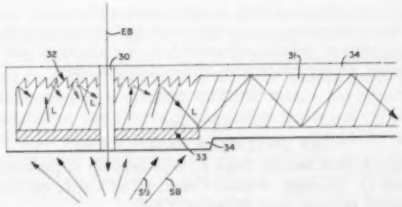
(ii) alpha particles, in an amount of less than about 2500 such particles per minute, in addition to those generated by said radon[222] and its decay products.

4,177,379

BACK-SCATTERED ELECTRON DETECTOR FOR USE IN AN ELECTRON MICROSCOPE OR ELECTRON BEAM EXPOSURE SYSTEM TO DETECT BACK-SCATTERED ELECTRONS

Yasuo Furukawa, Tokyo; Yoshiro Goto, Yokohama, and Takefumi Inagaki, Kawasaki, all of Japan, assignors to Fujitsu Limited, Japan

Filed Sep. 14, 1978, Ser. No. 942,455
Claims priority, application Japan, Sep. 14, 1977, 52-124112[U]
Int. Cl.[2] G01N *23/00*
U.S. Cl. 250—306 **12 Claims**



1. A back-scattered electron detector for use in an electron microscope or electron beam exposure system comprising:

a transparent plate having;

a scintillator part for emitting light outputs in accordance with electrons back-scattered from a specimen to be observed in an electron microscope or to be exposed with electrons in an electron beam exposure system, said scintillator part being provided with a hole through which a primary electron beam passes to the specimen and with gratings by which the emitted light outputs are reflected; and

a transmitting part for transmitting the emitted, scattered light outputs from the scintillator part;

metal-backing means on the surface of said transparent plate for increasing light reflecting efficiency thereof; and

convertor means connected to said transparent plate for converting the transmitted light outputs into corresponding electric signals.

4,177,380

METHOD AND APPARATUS FOR MAKING AND DEVELOPING IONOGRAPHIC IMAGES OF X-RAYED OBJECTS

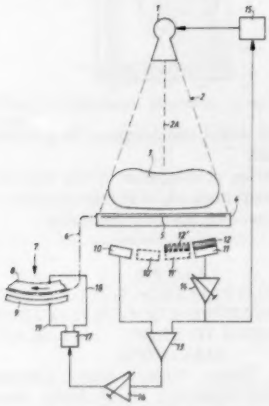
Rolf Eickel, and Alfred Rheude, both of Munich, Fed. Rep. of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jan. 6, 1978, Ser. No. 867,494

Claims priority, application Fed. Rep. of Germany, Jan. 28, 1977, 2703426

Int. Cl.[2] G03G *13/00, 15/00*

U.S. Cl. 250—315.2 **18 Claims**



1. A method of making and processing latent images of X-rayed objects on dielectric receptor sheets which are confined in the interelectrode gap of an ionography imaging chamber during exposure to object-modulated X-rays including primary radiation and stray radiation, comprising the steps of exposing a receptor sheet to object-modulated X-rays whereby said stray radiation causes the formation of a first electrostatic charge pattern and the primary radiation causes the formation of a second charge pattern on the receptor sheet, said patterns together constituting the latent image; and neutralizing the first charge pattern, which corresponds to the action of said stray radiation, during processing of the receptor sheet.

4,177,381

GAS ANALYZER SAMPLE CELL

Edward A. McClatchie; Dean A. Watson, both of Berkeley, and Irvin G. Burough, Walnut Creek, all of Calif., assignors to Andros Incorporated, Berkeley, Calif.

Division of Ser. No. 749,836, Dec. 13, 1 5, Pat. No. 4,103,174, which is a division of Ser. No. 509,838, Sep. 27, 1974, Pat. No. 4,013,260. This application Apr. 13, 1978, Ser. No. 895,937

Int. Cl.[2] G01J *1/00;* G01N *1/10, 21/24, 21/26*

U.S. Cl. 250—343 **2 Claims**

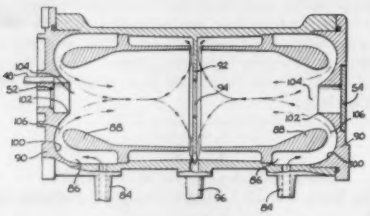
1. A sample cell for an infrared gas analyzer comprising:

an enclosure for a gas sample;

first and second windows in said enclosure, one of said windows being adjacent each end of said enclosure, said windows being substantially transparent to infrared radiation so as to define an infrared radiation path through said sample cell;

inlet means adjacent each end of the said enclosure for providing a gas sample to the interior of said cell adjacent each end thereof, outlet means between said inlet means for removing a gas sample from said cell,

flow control means adjacent each end of said enclosure for receiving a gas sample from the respective inlet means and establishing flows having substantial components toward said outlet means and having a substantial component in the radial inward direction, thereby creating a form of stagnation plug inwardly adjacent each of said windows,



and a central member extending transversely in the interior of said sample cell substantially midway between the ends thereof and having an opening accommodating the radiation path, said central member being spaced from said outlet means to allow removal of gas from both sides of said central member.

4,177,382

RADIOGRAPHY

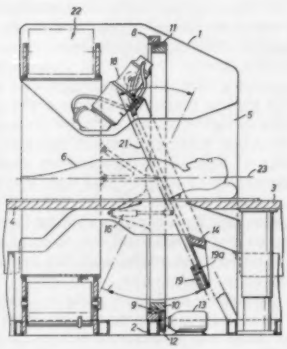
Godfrey N. Hounsfield, Newark, England, assignor to E M I Limited, Hayes, England

Continuation of Ser. No. 790,474, Apr. 25, 1977, abandoned. This application Oct. 3, 1978, Ser. No. 948,301

Claims priority, application United Kingdom, Apr. 28, 1976, 17204/76

Int. Cl.[2] G03B *41/16*

U.S. Cl. 250—445 T **9 Claims**



1. Medical radiographic apparatus comprising means for defining a patient position, generating means for generating a substantially planar, fan-shaped distribution of X-radiation, means for mounting said generating means so that said radiation propagates through said patient position, detector means, including an array of detector devices disposed in an array extending across said distribution, for detecting radiation projected through said patient along a plurality of divergent beam paths in said distribution, rotating means causing said generating means and said detector means to rotate around said patient position about respective centers of rotation which are on a common axis so that said generating means projects said radiation through said patient position from a plurality of locations while rotating about its center of rotation and so that said detector means detects radiation emergent from the patient position along further groups of beam paths originating from

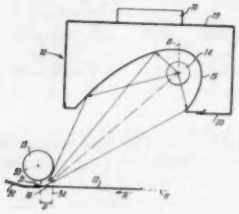
respective ones of said locations while the detector means rotates about its center of rotation; means being provided to change the spacing between the respective centers of rotation of the generating means and the detector means, such means being synchronised in operation with said rotating means and causing said spacing to change during a number of rotations of said generating means and said detector means around said patient position; the radiation, during all of said rotations, traversing a common region in the vicinity of said axis.

4,177,383

APPARATUS FOR TREATING A SHEET MATERIAL WITH RADIATION

Ronald E. Knight, Slough, England, assignor to Wallace Knight Limited, Slough, England

Filed May 4, 1978, Ser. No. 902,690
Int. Cl.[2] G01J *1/00*; A61K *27/02*
U.S. Cl. 250—492 R **7 Claims**



1. Apparatus for treating the surface of a sheet material with radiation comprising a lamp assembly, gripper means for pulling the sheet material by a leading margin along a path past the lamp assembly, the gripper means having a portion which is located on the same side of said path as said lamp assembly and which overlies a part of the surface to be treated and the lamp assembly being adapted to produce a beam of radiation having a main focus substantially on said path, the beam being generally downstream-directed and slanted at an acute angle relative to said path so that a substantial portion of said overlain surface part is exposed to focused radiation as the sheet material is moved along the path.

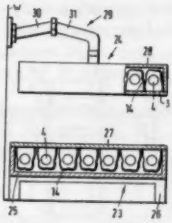
4,177,384

APPARATUS FOR PRODUCING ULTRAVIOLET RADIATION

Friedrich Wolff, Lindenring 17, D-6000 Frankfurt am Main, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 716,253, Aug. 20, 1976, Pat. No. 4,095,113, and Ser. No. 716,254, Aug. 20, 1976, Pat. No. 4,106,083. This application Feb. 23, 1978, Ser. No. 880,567
Claims priority, application Fed. Rep. of Germany, Feb. 24, 1977, 2707920
The portion of the term of this patent subsequent to Jun. 13, 1995, has been disclaimed.
Int. Cl.[2] G01J *1/00*
U.S. Cl. 250—494 **15 Claims**

1. Apparatus for selective treatment by ultraviolet radiation, especially for treatment of skin diseases including psoriasis, comprising a plurality of closely adjacent parallel elongated sources of ultraviolet radiation each including a low-pressure mercury lamp having a layer of luminous material, said sources being arranged to emit a continuous spectrum whose intensity is higly pronounced in the region between approximately 300 and 330 nm and decreases pronouncedly at the wavelength of approximately 330 nm; and filter means arranged to absorb



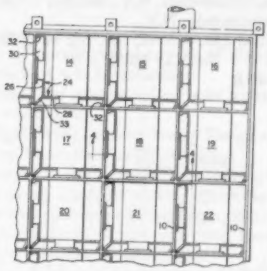
radiation below approximately 295 nm, the transmissivity of said filter means increasing abruptly above 295 nm.

4,177,385

NUCLEAR FUEL STORAGE

Frank Bevilacqua, Windsor, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Sep. 19, 1977, Ser. No. 834,634
Int. Cl.[2] G21F *5/00*
U.S. Cl. 250—507 **8 Claims**



1. A nuclear fuel storage apparatus for use in a water filled pool comprising: an egg crate structure of thermal neutron absorbing material, having vertically extending rectangular openings, adjacent openings having a common wall therebetween extending through a height generally equal to or exceeding the active length of the fuel to be stored; a plurality of inserts of neutron absorbing material, each adapted to slidably fit within a respective opening, said inserts each having a first plate parallel to one side of the openings and a second plate parallel to an adjacent side of the opening, said plates adjacently connected and having a length generally equal to or greater than the active length of the fuel to be stored; means for holding said inserts within the openings, with the first and second plates spaced a predetermined distance from the parallel sides of the opening; and means for supporting fuel to be stored at locations bounded by said plates and to sides of the respective opening.

4,177,386

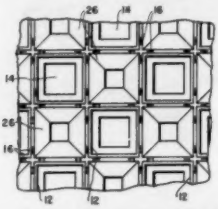
METHOD AND APPARATUS FOR STORING NUCLEAR FUEL ASSEMBLIES IN MAXIMUM DENSITY RACKS

William J. Wachter, R.D. 4, English Rd., Wexford, Pa. 15090, and Thomas R. Robbins, 1528 Crofton Pkwy., Crofton, Md. 21114

Filed May 26, 1978, Ser. No. 910,156
Int. Cl.[2] G21F *5/00*
U.S. Cl. 250—507 **7 Claims**

1. A storage rack for spent nuclear fuel assemblies for immersion in water, said rack comprising a plurality of identical

storage cells disposed adjacent each other in a regular array with adjacent cells connected together, cap members disposed on alternate cells and adapted to guide fuel assemblies into adjacent cells whereby the rack initially contains fuel assemblies in at least half of the storage cells, the remaining cells



being filled with water, and at least some of said cap members being removable to permit fuel assemblies to be placed in additional cells in a final pattern determined by the actual level of reactivity of said fuel assemblies such that criticality is prevented.

4,177,387

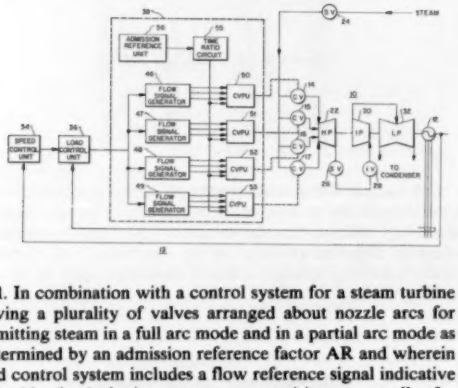
METHOD AND APPARATUS FOR CONTROLLED-TEMPERATURE VALVE MODE TRANSFERS IN A STEAM TURBINE

Paul E. Malone, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jan. 6, 1978, Ser. No. 867,572

Int. Cl.[2] H02P *9/04*

U.S. Cl. 290—40 R **6 Claims**



1. In combination with a control system for a steam turbine having a plurality of valves arranged about nozzle arcs for admitting steam in a full arc mode and in a partial arc mode as determined by an admission reference factor AR and wherein said control system includes a flow reference signal indicative of turbine load, the improvement comprising a controller for transferring between modes so that steam flow remains substantially constant during transfer and temperature of a predetermined portion of the turbine varies substantially linearly with admission reference factor as it is varied between modes, said controller comprising:

means for generating said admission reference factor AR and for varying said factor during a mode transfer;

time ratio means for generating a multiplier (1−AR) in responsive to said admission reference factor;

a plurality of flow signal generators, there being one flow signal generator per valve, each said flow signal generator producing a full arc mode signal FA, a partial arc mode signal PA, and a reversing signal R, each said signal being a preselected function of said flow reference signal;

a plurality of signal conditioners for producing a plurality of combined flow signals according to the signal relationship FA+(R+PA) (1−AR), there being one signal conditioner and one combined flow signal per valve; and,

a plurality of lift signal generators for producing valve lift signals in response to said combined flow signals, there being one lift signal generator per valve.

4,177,388

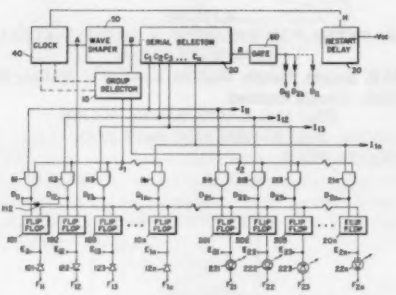
PROGRAMMABLE CONTROL FOR LOAD MANAGEMENT

Mike I. Lingenfelter, State College, Pa., assignor to Louise D. Subey, Pine Grove Mills, Pa.

Filed Jul. 10, 1978, Ser. No. 923,449

Int. Cl.[2] H02J *13/00*

U.S. Cl. 307—38 **7 Claims**



1. A programmable control for load management of a plurality of electrical power loads, the programmable comprising:

(a) at least a first and a second group of load control means for controlling the power supplied to loads connected to pre-selected ones of the load control means,

(b) a group selector means for selecting which of the groups is functionally operative at any given instant in time,

(c) a serial selector means, commonly connected to each of the load control means in all of the groups, for serially selecting one of the load control means in each group for conduction for at least one period of the serial selector means,

(d) at least a first set of programming points, each point situated at an input to a load control means logically common with the output of the serial selector means,

(e) means selectively connecting at least two of the first set of programming points together for modifying the duration or order of a conduction state of at least one of the load control means, and

(f) means operative in the event of a power failure for delaying for a period of time the conduction on any of the load control means upon restoration of power.

4,177,389

POWER SUPPLY SYSTEM WITH TWO REGULATED POWER SUPPLY DEVICES CONNECTED IN PARALLEL AT AN OUTPUT

Heinrich Schott, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Oct. 28, 1977, Ser. No. 846,362

Claims priority, application Fed. Rep. of Germany, Oct. 28, 1976, 2649087

Int. Cl.[2] G05F *1/64*

U.S. Cl. 307—64 **9 Claims**

9. A power supply system comprising:

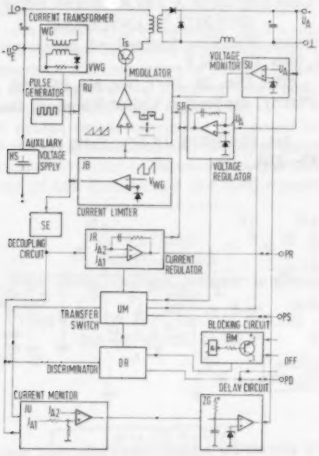
(a) two substantially similar regulated power supply devices having outputs connected in parallel;

(b) each power supply device having a switching means for regulating, current sensing means connected to the switching means, and a regulating control circuit means connected for controlling the switching means, said circuit control means comprising

(i) a voltage regulator means and a current regulator

means having their respective outputs connected to control the switching means;

(ii) a discriminator means for comparing the load currents from the current sensing means in each power supply device;



(iii) a transfer switch means controlled by the discriminator means and connected to the voltage regulator and current regulator means for activating one of the voltage and current regulators and deactivating the other of the regulators in response to an output from the discriminator means.

4,177,390

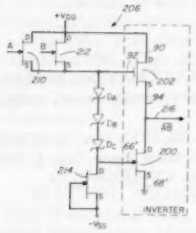
A FIELD EFFECT TRANSISTOR LOGIC GATE HAVING DEPLETION MODE AND ENHANCEMENT MODE TRANSISTORS

Arthur M. Cappon, Boston, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Dec. 27, 1977, Ser. No. 864,292

Int. Cl.[2] H03K *19/08, 19/12, 19/36, 19/40*

U.S. Cl. 307—205 **11 Claims**



1. A logic gate comprising:

(a) a first depletion mode field effect transistor having a gate electrode for coupling to a control signal source;

(b) a second depletion mode transistor;

(c) an enhancement mode field effect transistor, such enhancement mode field effect transistor and second depletion mode transistor being serially connected together and being coupled to the first depletion mode transistor, one of such serially coupled transistors having a Schottky gate contact; and

(d) bias means coupled to the first and second depletion mode transistors for biasing the second depletion mode transistor and the enhancement mode field effect transistor with opposite states of conduction selectively in accordance with the control signal.

4,177,391

CHARGE TRANSFER SEMICONDUCTOR DEVICE

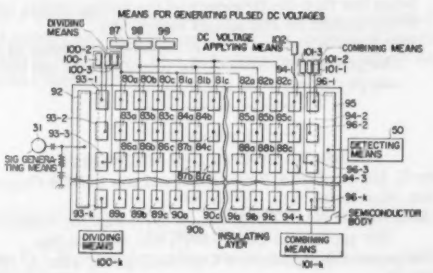
Hideo Sunami; Masaharu Kubo, both of Hachioji, and Iwao Takemoto, Kodaira, all of Japan, assignors to Hitachi, Ltd., Japan

Continuation of Ser. No. 436,336, Jan. 24, 1974, abandoned. This application Jan. 16, 1976, Ser. No. 649,746

Claims priority, application Japan, Jan. 24, 1973, 48-9516

Int. Cl.[2] G11C *19/28;* **H01L** *29/78*

U.S. Cl. 307—221 D **21 Claims**



1. A charge transfer semiconductor device comprising:

a plurality of parallel-spaced rows of charge transfer elements, each of which includes

a semiconductor substrate along which charge carriers are to be transferred;

signal input means for introducing charge carriers at a first selected location in said substrate;

signal output means for producing an output signal representative of charge carriers which have been transferred thereto along said substrate, disposed at a second selected location in said substrate, spaced apart from said first selected location;

signal transfer means including a plurality of electrodes electrically insulated from said substrate, and sequentially disposed along the surface of said substrate between said first and second selected locations, for transferring charge carriers between said signal input means and said signal output means;

input gate means disposed between said first selected location and one end of said electrodes; and

storage means, disposed between said second location and the other end of the electrodes of said transfer means, for temporarily storing charge carriers which have been transferred beneath said plurality of electrodes prior to being delivered to said signal output means, each of said storage means being disposed in parallel spaced apart relationship with the other storage means, so that the plurality of storage means of said rows form a column of storage means perpendicular to said rows;

first means, connected to the signal input means of said charge transfer elements, for providing an input signal into the signal input means of the respective ones of said plurality of parallel-spaced rows of charge transfer elements;

a plurality of respective second means, each of which is connected to each respective input gate means of each charge transfer element, for selectively applying a respective voltage pulse to each respective input gate means, shifted in time with respect to the respective pulses applied to each other input gate means, whereby charge carriers are introduced into said substrate;

third means, connected to the signal transfer means of said charge transfer elements, for effecting the sequential transfer of introduced charge carriers along said substrate

beneath the signal transfer means of the respective ones of said plurality of charge transfer elements, said third means including a prescribed number of plural voltage transfer pulse generators for applying a prescribed number of voltage transfer pulses to the plurality of electrodes of each row, shifted in time with respect to one another, so that the voltage transfer pulse applied to a respective electrode of the plurality of electrodes of each row is shifted in time with respect to the voltage transfer pulses applied to adjacent electrodes of that particular row, and is applied in common to adjacent parallel electrodes of the other signal transfer means, said prescribed number of plural voltage transfer pulse generators being less than the number of parallel-spaced rows of charge transfer elements, and the frequency of said voltage transfer pulses being less than the frequency of the voltage pulses selectively applied by said second means; and

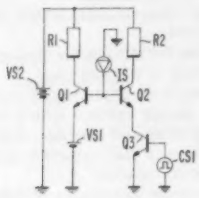
fourth means, connected to the signal output means of said charge transfer elements, for detecting said transferred charge carriers as an output signal.

4,177,392

CURRENT SWITCHING NETWORKS

Peter E. Haferl, Zurich, Switzerland, assignor to RCA Corporation, New York, N.Y.

Division of Ser. No. 757,375, Jan. 6, 1977, Pat. No. 4,081,721.
This application Oct. 7, 1977, Ser. No. 840,394
Claims priority, application United Kingdom, Feb. 4, 1976, 04406/76
Int. Cl.[2] H03K *17/00, 5/04*
U.S. Cl. 307—254 13 Claims



1. A current switching network comprising:

a constant current generator having first and second terminals between which current is supplied;

a first current amplifier having input and output and common connections, said first current amplifier being of a type exhibiting unilateral conduction from its input connection to its common connection through a unilaterally conductive input circuit therebetween and having its input connection clamped to its common connection during such unilateral conduction so their departure in potential does not exceed a predetermined value;

means for selectively connecting the input circuit of said first current amplifier for unilateral conduction between the first and second terminals of said constant current generator;

unilaterally conductive means connected between the first and second terminals of said constant current generator for selectively conducting that portion of the current supplied by said constant current generator as does not flow to the input circuit of said first current amplifier, said unilaterally conductive means being of a type conductive only when the potential thereacross exceeds a threshold value, which threshold value is chosen larger than said predetermined value plus any potential drop exhibited by said means for selectively connecting the input circuit of said current amplifier; and

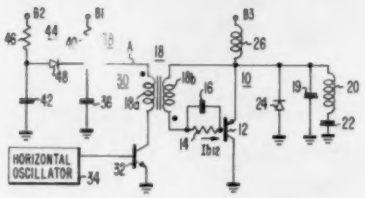
means connected between the common and output connections of said first current amplifier for extracting a first output current flowing in response to the selective connection of the input circuit of said first current amplifier between the first and second terminals of said constant current generator.

4,177,393

DRIVE CIRCUIT FOR A TELEVISION DEFLECTION OUTPUT TRANSISTOR

Gerhard Förster, Würenlos, Switzerland, assignor to RCA Corporation, New York, N.Y.

Filed Dec. 20, 1977, Ser. No. 862,386
Claims priority, application United Kingdom, Dec. 20, 1976, 53174/76
Int. Cl.[2] H03K *17/00;* H03B *41/00*
U.S. Cl. 307—270 9 Claims



1. A drive circuit for a kinescope deflection output transistor, comprising:

drive transformer means including a secondary winding coupled with a base-emitter junction of the output transistor and also including a primary winding;

driver switch means serially coupled with said primary winding of said drive transformer means thereby forming a switched winding;

first energy storage means coupled to said switched winding;

a first source of energizing potential coupled to said first energy storage means for energy charging thereof;

second energy storage means;

unidirectional current conducting means coupled to said first and second energy storage means for providing energy flow therebetween;

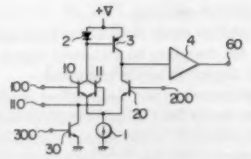
a second source of energizing potential coupled to said second energy storage means for energy charging thereof, said second source of potential having a magnitude substantially less than that of said first.

4,177,394

COMPARATOR CIRCUIT HAVING MULTI-FUNCTIONS

Wasao Takasugi, Higashiyamato, Japan, assignor to Hitachi, Ltd., Japan

Filed Aug. 29, 1977, Ser. No. 828,672
Claims priority, application Japan, Sep. 1, 1976, 51-103645
Int. Cl.[2] H03K *5/20*
U.S. Cl. 307—357 13 Claims



1. A comparator circuit comprising:

first and second transistors having respective input electrodes for receiving first and second input signals, respectively;

a third transistor having an input electrode for receiving a third input signal to be compared with said first and second input signals;

input means connected to the respective input electrodes of said first, second and third transistors for supplying said first, second and third input signals;

a current source connected in common to said first output electrodes of said first, second and third transistors;

a first control means connected to the input electrode of said first transistor and responsive to a control signal for selectively rendering said first transistor non-conductive independent of said first input signal;

potential source means connected to second output electrodes of said first, second and third transistors; and

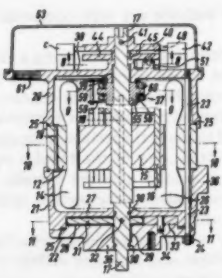
output means connected to the second output electrode of at least one of said first, second and third transistors.

4,177,395

ACTUATORS

Donald L. Hore, Bath, England, assignor to Rotork Limited, Bath, England

Filed Dec. 19, 1977, Ser. No. 862,092
Int. Cl.² H02K *33/00*
U.S. Cl. 310—39 **15 Claims**



1. An electrically operated quarter-turn actuator incorporating a single phase 2-pole dynamo-electric machine comprising a laminated stator having slots with three windings therein arranged to be energised to provide alternating or reversing flux, and a laminated rotor movable with respect to the stator and having a plurality of short-circuited continuous loops to which there are no external connections, wherein the rotor is coupled directly to the output shaft of the actuator, and the three stator windings are each connected with the power supply through a respective limit switch, the limit switches being cam operated from the output shaft, and the windings and switches being so arranged that the same one only of said windings is energised to complete the travel of the rotor in each direction of movement.

4,177,396

ELECTRIC MOTORS

Patrick Wang, Chai Wan, Hong Kong, assignor to Johnson Electric Industrial Manufactory Limited, Chai Wan, Hong Kong

Filed Nov. 1, 1977, Ser. No. 847,656
Claims priority, application France, Dec. 10, 1976, 76 37298
Int. Cl.² H02K *11/00*
U.S. Cl. 310—68 C **3 Claims**

1. An electric motor comprising a body, a stator and a rotor mounted within said body, at least the rotor having windings, a cover closing an axial end of said body and supporting two cages and two electrical input terminals, and two brushes each slidable in a respective one of said cages and engaging the rotor to supply current to the windings of the rotor, one of the electrical input terminals being directly connected to one of said cages and the other input terminal being connected to the other cage by way of a bimetal thermal switch, and wherein the bimetal is constituted by a bimetallic annulus having a central tab which is secured to a part of said other input terminal and having on its periphery a contact stud co-operating

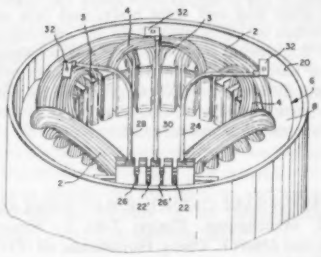
with a corresponding contact stud electrically connected to said other cage to interrupt the current supply to the rotor windings in response to a predetermined temperature being attained within said body.

4,177,397

ELECTRICAL CONNECTIONS FOR WINDINGS OF MOTOR STATORS

John F. Lill, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 17, 1978, Ser. No. 887,584
Int. Cl.² H02K *11/00*
U.S. Cl. 310—71 **7 Claims**



1. In an electric motor sub-assembly of the type comprising a hollow cylindrical motor housing, a stator disposed in said housing and coil windings on said stator, said stator having oppositely directed faces and an external circumferential surface, said circumferential surface having arcuate portions which are against internal surface portions of said housing, and having portions which are adjacent to said arcuate surface which are spaced from said internal surface of said housing, the improvement to said sub-assembly comprising:

a terminal housing mounted on one of said faces of said stator, said housing comprising an elongated block of insulating material having a terminal-receiving face and having terminal-receiving cavities extending into said terminal-receiving face, said housing extending across said face at a location adjacent to one of said arcuate portions,

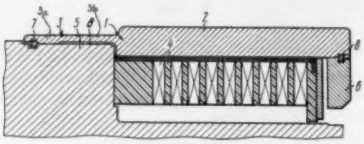
integral retaining means extending from said housing, said retaining means comprising parallel spaced-apart legs extending from said housing and an integral strut extending between the ends of said legs, said legs extending across said adjacent portions of said circumferential surface on each side of said one arcuate portion, said strut extending across the other one of said faces whereby, said housing and retaining means are captured on said stator by said arcuate surface portions of said stator and said internal wall portion of said housing.

4,177,398

SHROUD FOR MOUNTING ROTOR END WINDING IN ELECTRIC MACHINE

Galina A. Zagorodnaya, Altaiskaya ulitsa, 20, kv. 5; Gurgen P. Vartanian, Budapeshtskaya ulitsa, 15, korpus 2, kv. 29; Garri M. Khutoretsky, Altaiskaya ulitsa, 20, kv. 5, and Vladimir M. Fridman, Grazhdansky prospekt, 13, korpus 1, kv. 170, all of Leningrad, U.S.S.R.

Continuation of Ser. No. 595,217, Jul. 11, 1975, abandoned. This application Feb. 24, 1977, Ser. No. 771,826
Int. Cl.[2] H02K 3/46
U.S. Cl. 310—270 4 Claims



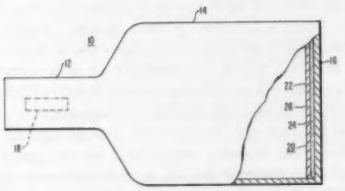
1. A shroud for attachment to an electrical machine rotor having an end winding cantilevered to an end portion of the rotor comprising: a rotor body; said shroud including a cylindrical shell having two axial portions of different thickness, one being a thickened portion, the other a thinned portion, said thickened portion starting immediately from the end of the rotor body and embracing the end winding to secure the latter from centrifugal forces, said thinned portion embracing the rotor body and including a first part adapted for an interference fit over said body to secure the shroud in radial direction; said thinned portion including a second part providing an annular gap at the edge of said rotor body between said thinned portion and said rotor body, said first part of said thinned portion which is adapted for the interference fit over said rotor body being separated from the thickened-portion, said second part of said thinned portion which provides said annular gap allowing for resilient radial displacement of the thickened portion relative to said rotor body without substantial reduction of the interference fit.

4,177,399

HIGH CONTRAST CATHODE RAY DISPLAY TUBE

Vincent J. Muccigrosso, Elmira; John L. Nivison, Elmira Heights, and Albert E. Oberg, Horseheads, all of N.Y., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 25, 1978, Ser. No. 909,416
Int. Cl.[2] H01J 29/20, 29/89
U.S. Cl. 313—368 1 Claim



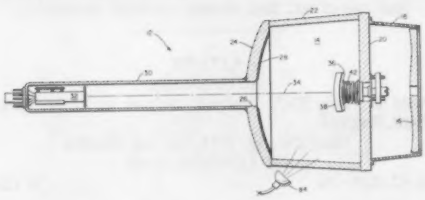
1. A cathode ray display tube with improved contrast for viewing the display in high ambient light levels wherein the tube includes a display faceplate portion with a display screen phosphor layer on the interior surface of the faceplate portion, the improvement wherein the tube faceplate portion is formed of a glass which is a green color filter glass of low relative transmissivity of at least 0.1 over the range of 532 to 558 μm, and the transmissivity of the color filter glass peaks at about 0.125 at about 545 μm, and the phosphor layer is terbium activated gadolinium oxysulfide which exhibits cathodoluminescent emission such that a high percentage of the total phosphor emission energy is concentrated between 540–550 μm and within the narrow range of wavelength for which the glass transmissivity peaks.

4,177,400

PROJECTION CATHODE RAY TUBE HAVING TARGET ANGULARLY AND LONGITUDINALLY ADJUSTABLE TO TUBE AXIS

George R. Hergenrother, Waltham, and Peter J. Sprague, Lenox, both of Mass., assignors to Advent Corporation, Cambridge, Mass.

Filed Mar. 27, 1978, Ser. No. 890,321
Int. Cl.[2] H01J 31/00, 29/24
U.S. Cl. 313—477 R 10 Claims



1. A projection cathode ray tube comprising the combination of

a sealed evacuated envelope comprising a tubular portion, a mirror portion sealed to one end of the tubular portion, the mirror portion having an inner concave mirror surface with a first aperture therein, an electron gun container portion sealed to the first aperture, a transparent face plate sealed to the other end of the tubular portion, the face plate having a second aperture therein, and a bellows having one end sealed to the second aperture and being closed at the other end thereof,

a target member within the envelope, attached to said other end of the bellows and having a surface with an electron beam sensitive coating thereon,

an electron gun within said electron gun container portion in position to direct a beam of electrons on to said coating, said mirror surface being located to reflect light between said coating and said face plate, and

means to adjust the target member position relative to the mirror portion including a shaft portion extending through the bellows and having an axis adjustably rotatable relative to said face plate, one end of the shaft portion being engaged with the target member and adapted to impart movements thereto longitudinally of the shaft portion and rotatably relative to said faceplate, a frame portion extending laterally from the other end of the shaft portion exteriorly of the envelope and having reference surface thereon each in engagement with the face plate, and means on the frame portion for independently adjusting the displacement between each of said reference surfaces and the target member.

4,177,401

LOW PRESSURE METAL VAPOR DISCHARGE LAMP WITH TUBULAR MEMBER AND MAGNETIC MEANS

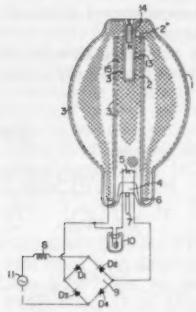
Mikiya Yamane; Teruichi Tomura, both of Kunitachi, and Yoshio Watanabe, Tokyo, all of Japan, assignors to Hitachi, Ltd., Japan

Filed May 2, 1978, Ser. No. 902,058
Claims priority, application Japan, May 4, 1977, 52-50748
Int. Cl.[2] H01J 1/50, 61/10, 61/30, 61/42
U.S. Cl. 313—485 24 Claims

1. A low pressure metal vapor discharge lamp comprising:

a discharge envelope including an outer bulb made of light-transmissive material and an inner tube disposed within said outer bulb, said inner tube having one open end and the other closed end;

an inert gas and metal filled in said envelope;
a cathode disposed interiorly of said inner tube;
an anode disposed exteriorly of said inner tube and interiorly of said outer bulb; and



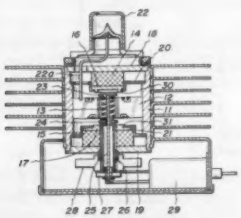
magnetic field applying means disposed near the open end of said inner tube for applying a magnetic field near the open end.

4,177,402

MAGNETRON POLE PIECE ASSEMBLY

Yoshio Ishida, Mobara, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 23, 1978, Ser. No. 880,587
Claims priority, application Japan, Jun. 24, 1977, 52-82497[U]
Int. Cl.² H01J *25/50*
U.S. Cl. 315—39.71 **6 Claims**



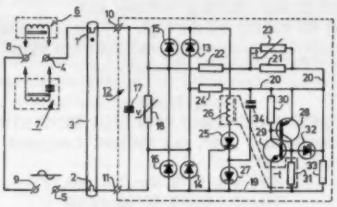
1. In a magnetron comprising an outer casing which includes an anode cylinder and yokes disposed at the both ends of said anode cylinder and is adapted to form a vacuum space, a plurality of vanes centripetally extending from the inner wall of said anode cylinder, a cathode structure disposed so as to form an interaction space between itself and said vanes, a holder located within said vacuum space which is firmly fixed on the inner wall of said anode cylinder and which has an opening formed in the center thereof, and a pole piece and a magnet disposed between said holder and one of said yokes, the improvement wherein through the opening formed at the center of said holder said pole piece is made to project into said interaction space and is metallically bonded to said holder at the periphery of said opening.

4,177,403

ELECTRONIC STARTER FOR IGNITING A DISCHARGE LAMP

Michel Remery, Evreux, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 16, 1978, Ser. No. 870,026
Claims priority, application France, Jan. 31, 1977, 77 02585
Int. Cl.² H05B *41/16, 41/04*
U.S. Cl. 315—101 **19 Claims**



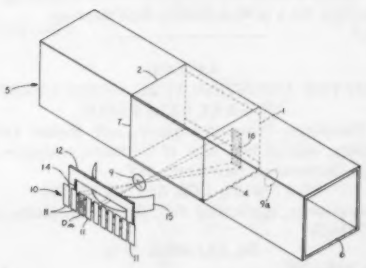
14. An electronic starter for igniting an electric discharge lamp comprising, a pair of input terminals for supplying an operating voltage to the electronic starter, a controlled semiconductor switch connected across said input terminals, said semiconductor switch including first and second electrodes that define a current control for the switch, a control circuit coupled between said first and second electrodes for controlling the operation of said semiconductor switch, said control circuit including a temperature-sensitive element, a voltage threshold element and an auxiliary switch having control electrode means, means coupling the auxiliary switch to at least one of said first and second electrodes of the semiconductor switch so as to control the operating condition of the semiconductor switch, means including said threshold element for coupling the control electrode means of the auxiliary switch to one of said input terminals so that the operating condition of the auxiliary switch is determined by the voltage level of said one input terminal, and means connecting the temperature-sensitive element to the control electrode means of the auxiliary switch thereby to effectively inhibit the operation of the auxiliary switch and thereby the operation of said semiconductor switch when the temperature of the temperature-sensitive element exceeds a given temperature level.

4,177,404

ARC DETECTOR FOR GLOW DISCHARGES

Ronald G. Eguchi, Long Beach, Calif., assignor to Northrop Corporation, Los Angeles, Calif.

Filed Apr. 12, 1978, Ser. No. 895,727
Int. Cl.² H05B *41/36;* H02H *7/20*
U.S. Cl. 315—151 **14 Claims**



5. In an electric discharge device having a discharge volume with an anode and a cathode on opposite sides thereof, and having a high voltage impressed across said anode and cathode

for forming a stabilized glow in said discharge volume; means for preventing arcing across said volume, comprising:

a. photodetector means;

b. optical means presenting a complete transverse portion of said discharge volume to the field of view of said photodetector means;

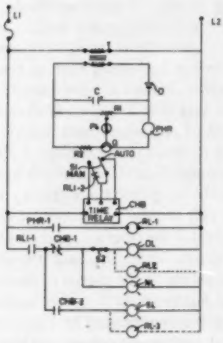
c. electrical output circuit means operatively connected to said photodetector means for producing an electrical signal in response to the optical power reaching said photodetector means from the luminosity of an arc beginning to form in said discharge volume; and

d. means for cutting off the high voltage across said anode and cathode in response to said electrical signal.

4,177,405
PHOTOCELL-CONTROLLED LIGHTING SYSTEM

Martial Chapdelaine, 2667, rue Prévert, Longueuil, Quebec, Canada (J4L 1T8)

Filed May 5, 1978, Ser. No. 903,167
Int. Cl.[2] H05B *37/02, 39/02*
U.S. Cl. 315—159 **7 Claims**



1. A photocell-controlled lighting system comprising:

(a) a first photocell-controlled relay operated by a photocell;

(b) at least one night or decorative light adapted to be connected to a power source;

(c) at least one spotlight also adapted for connection to said power source;

(d) a second relay adapted for connection to said power source and responsive to energ ation of said photocell-controlled relay for energizing said night or decorative light, and to de-energization of said photocell-controlled relay when the photocell is illuminated by the lights of an automobile entering the driveway of a house for switching off said night or decorative light; and

(e) a third time relay adapted for connection to said power source and operated by said second relay when the lights of the automobile are switched off for switching on said spotlight for a predetermined time interval.

4,177,406
CIRCUIT FOR ADJUSTING TUBE ANODE CURRENT IN AN X-RAY GENERATOR

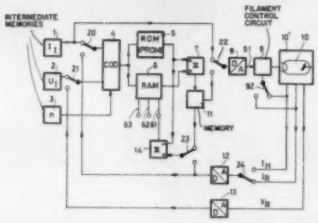
Bernd Hermeyer, Henstedt-Ulzburg, and Rudolf Ochmann, Hamburg, both of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 25, 1978, Ser. No. 872,090
Claims priority, application Fed. Rep. of Germany, Jan. 28, 1977, 2703420
Int. Cl.[2] H05G *1/34*
U.S. Cl. 315—307 **6 Claims**

1. In a circuit for adjusting anode current in an X-ray generator of the type which includes coding means which function to form an address from values of anode current and tube voltage; addressable memory means which function to store filament current values associated with different combinations of anode current and tube voltages and to select and fetch these values in response to addresses formed by the coding means; and filament current adjusting means connected to receive the filament current values fetched from the memory means, which function to adjust a filament current in response to the values fetched; the improvement wherein:

the circuit further comprises

a buffer memory connected to store the filament current value fetched from the memory means;



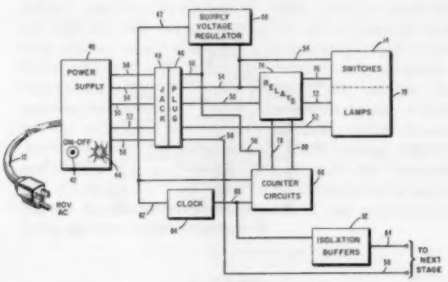
measuring means which function to measure the actual values of anode current and tube voltage during an X-ray exposure and which apply said measured values of anode current and tube voltage to the input of the coding means, whereby an address is formed from these measured values; and

means which function to store a filament current value from the buffer memory at a memory location in the memory means which is associated with the address formed from the measured values of anode current and tube voltage.

4,177,407
ELECTRONIC VOTIVE LIGHTS

Harold Goldstein, Westbury, and William T. Montren, Bayshore, both of N.Y., assignors to Control Electronics Co., Inc., Farmingdale, N.Y.

Filed Nov. 8, 1977, Ser. No. 849,650
Int. Cl.[2] H05B *37/00, 39/00, 41/00*
U.S. Cl. 315—312 **9 Claims**



1. An electronically controlled electric lamp assembly, comprising:

a plurality of relay means each having energizable coil portions for actuating control contact portions and power contact portions and each relay means being connected to the power source;

a plurality of switch means corresponding to said plurality of relay means, one being electrically connected between one of said plurality of relay means and said electric power source for actuatably energizing said relay coil portions thereby actuating said control contact portions for causing said coil portions to remain energized;

a plurality of electric lamps connected to corresponding

power contact portions of said plurality of relay means, whereby upon said energization of said coil portions said power contact portions are actuated and corresponding lamps are energized; and

timing means electrically connected to said switch means and said coil portions of said relay means, whereby upon actuation of said switch, said timing means is activated for a predetermined period of time and upon the expiration of said predetermined period of time, said timing means lowers the current flow through said energized coil portions, thereby lowering the voltage drop across said energized coil portions and opening said control contact portions for deenergizing said coil portions and opening said power contact portions of said relay means for deenergizing a corresponding electric lamp.

4,177,408

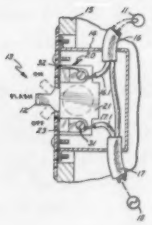
COMBINED SWITCH AND FLASHER

Robert D. Mason, 5501 Mick Ave., Kentwood, Mich. 49508

Filed Jun. 2, 1977, Ser. No. 802,883

Int. Cl.[2] H05B *37/02, 39/06, 41/04, 41/18*

U.S. Cl. 315—362 **9 Claims**



1. A switching apparatus connected to the existing two wires in a switch box, comprising

a housing to be accommodated within the switch box and having an open interior and a cover plate at one side of the open interior,

a base panel traversing the interior of the housing and confronting the sidewalls, a first face of the panel being spaced from the adjacent housing wall and cooperating therewith in defining an unobstructed pocket,

a flasher wafer in said pocket, and having electrical connection at its opposite faces, and

a mechanical switching mechanism within the housing and adjacent a second face of the base panel opposite the first face thereof and having circuit means connected in series with said flasher wafer.

4,177,409

VIDEO AMPLIFIER FOR DISPLAYING FOUR OR MORE VIDEO LEVELS ON A CATHODE RAY TUBE

Howard A. Chamberlin, Jr., Manchester, N.H., assignor to Hendrix Electronics Incorporated, Manchester, N.H.

Filed Feb. 13, 1978, Ser. No. 877,304

Int. Cl.[2] H01J *29/52*

U.S. Cl. 315—383 **8 Claims**

1. A video amplifier for generating at least four discrete output levels of video for a cathode ray tube display comprising

input decoding means for receiving at least two digital input lines and providing at least three output signal lines, said output lines uniquely representing the signal state of said input lines,

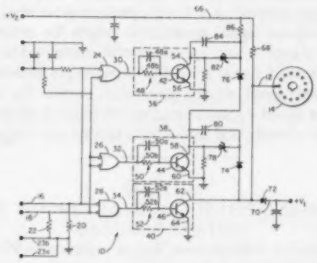
at least first, second, and third two-state switch elements, each switch element being associated with and responsive to a different one of said output signal lines, and each switch element providing, at respective first and second switch lines, a substantially short circuit, in response to a first state of said associated output signal line, and a substantially open circuit, in response to a second state of said associated output signal line,

means for providing a black video reference level to a video output line which, when applied to said cathode ray tube display, has sufficient potential to turn said cathode ray tube substantially off,

reference means associated with each switching element for connecting each first switch line to a common bright voltage reference level,

voltage determining means associated with each switching element for connecting each second switch line to said video output line, and

said input decoding means, said switching elements and said voltage determining means being connected to provide a priority switching system wherein



the video line is held at the bright voltage reference level when the first switch element is in a first state,

the video line is held at a normal voltage reference level when the second switch element is in said first state and the first switch element is in a second state,

the video line is maintained at a dim reference voltage when the third switch element only is in said first state,

the video line is maintained at said black video reference level when each switch element is in its second state, and

changes on said video line from one reference voltage level to another reference voltage level, in response to a change of digital input signal, are substantially monotonic,

whereby at least four voltage levels of video are obtained at the cathode ray tube display.

4,177,410

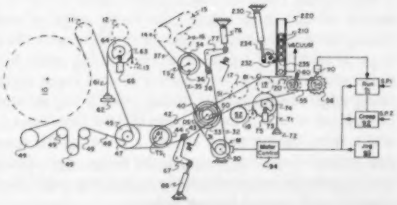
STRETCHABLE MATERIAL REWINDING MACHINE

Daniel J. Dowd, Williamsport, Pa., assignor to Westvaco Corporation, New York, N.Y.

Division of Ser. No. 750,469, Dec. 14, 1976, Pat. No. 4,103,840. This application Jan. 6, 1978, Ser. No. 867,231

Int. Cl.[2] H02P *7/00*

U.S. Cl. 318—163 **6 Claims**



1. A stretchable material rewinding machine comprising a plurality of web guide rolls along a web route between a material supply reel and a rewind reel, a rotational power source,

and speed control means therefor, a first rotational power transmission link between said power source and said supply reel, a second rotational power transmission link between said power source and said rewind reel, the improvement comprising:

A. First and second web tension sensing means along said web route between said supply reel and said rewind reel for monitoring and tensile stress within said web and generating first and second signals proportional thereto;

B. First and second infinitely variable speed ratio change means in said first and second rotational power transmission links, respectively, for changing the rotational ratio between said power source and said supply and rewind rolls, respectively, in respective response to said first and second signals;

C. Accumulated rewind reel length counting means for monitoring the length of web accumulated on said rewind reel and generating a third signal proportional thereto;

D. First speed signal generation means for emitting a first speed signal to said speed control means while in receipt of said third signal for a first reel length interim; and,

E. Second speed signal generation means for emitting a second speed signal to said speed control means while in receipt of said third signal for a second reel length interim.

4,177,411

SPEED-AND-PHASE CONTROL CIRCUIT FOR A ROTARY MACHINE

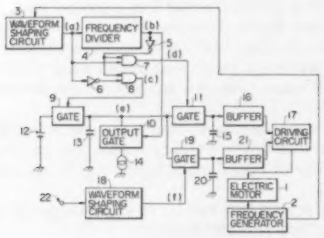
Saburo Takaoka, Tokorozawa, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Jul. 28, 1978, Ser. No. 929,053

Claims priority, application Japan, Jul. 28, 1977, 52-90569

Int. Cl.[2] H02D *5/06*

U.S. Cl. 318—314 **5 Claims**



1. A speed-and-phase control circuit for a rotary machine, comprising:

a. frequency divider means responsive to an input signal whose frequency is proportional to the revolution number of said rotary machine for providing frequency division of said input signal and for providing said frequency-divided input signal as a first output signal;

b. logical circuit means responsive to said input signal and to said first output signal for providing in timed relationship a first timing pulse having a pulse width equal to a half period of said input signal, the rising edge of said first timing pulse being substantially coincident with the falling edge of said input signal, a second timing pulse having a pulse width equal to one period of said input signal, the rising edge of said second timing pulse being substantially coincident with the falling edge of said first timing pulse, and a third timing pulse having a pulse width equal to a half period of said input signal, the rising edge of said third timing pulse being substantially coincident with the falling edge of said second timing pulse;

c. charging circuit means for charging a first capacitor circuit to a predetermined voltage level in response to said first timing pulse;

d. discharge circuit means for discharging according to the constant current mode said first capacitor circuit in response to said second timing pulse;

e. first gate circuit means for transferring said charge present on said first capacitor circuit to a second capacitor circuit in response to said second timing pulse; and

f. second gate circuit means for transferring said charge present on said first capacitor circuit to a third capacitor circuit in response to a reference timing pulse having a reference phase, whereby the speed and phase of said rotary machine is selectively controlled in accordance with the voltages present on said second and third capacitor circuits.

4,177,412

CLOSED LOOP ROTATIONAL SPEED CONTROL SYSTEM HAVING MEANS FOR GENERATING A PNM SIGNAL FOR AN ELECTRIC MOTOR

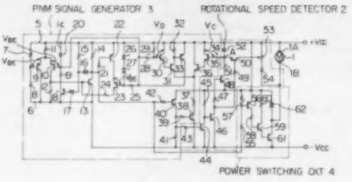
Hiroshi Minakuchi, Kadoma, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Japan

Filed Dec. 14, 1977, Ser. No. 860,440

Claims priority, application Japan, Dec. 15, 1976, 51/151118

Int. Cl.[2] H02P *5/06*

U.S. Cl. 318—341 **6 Claims**



1. A rotational speed control system for an electric motor comprising:

(a) a rotational speed detector for producing a DC voltage the magnitude of which varies in accordance with the rotational speed of the rotor of said electric motor;

(b) a PNM signal generator responsive to said rotational speed detector for producing a PNM signal comprising constant width pulses, the number of said pulses per a unit time varying in accordance with the magnitude of the DC voltage, said pulses being generated independently of rotational position of a shaft of said motor; and

(c) a power switching circuit responsive to said PNM signal generator and to said electric motor for switching the feed of electric power to said electric motor in accordance with the PNM signal, said power being removed from said motor during said constant width pulses.

4,177,413

BATTERY CHARGERS

Enzo Ascoli, Lausanne, Switzerland, assignor to The Gillette Company, Boston, Mass.

Filed Dec. 15, 1977, Ser. No. 861,044

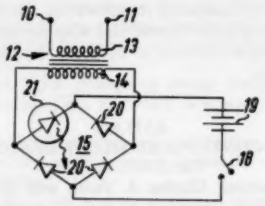
Claims priority, application United Kingdom, Apr. 20, 1977, 16382/77

Int. Cl.[2] H02J *7/00*; H02M *7/04*

U.S. Cl. 320—2 **4 Claims**

1. A charging circuit for charging a low voltage battery from an AC supply, said charging circuit comprising a full wave bridge rectifier network having four legs, a pair of input terminals connected across one diagonal of said bridge for connection to a low voltage AC charging supply, a pair of output terminals connected across the other diagonal of said bridge for connection to a battery to be charged, three of said four legs including a rectifying element presenting a first voltage drop, and said fourth leg including a light emitting diode presenting a second voltage drop exceeding said first voltage

drop, said light emitting diode serving both as a rectifying element excited only on alternate half cycles of said AC charg-



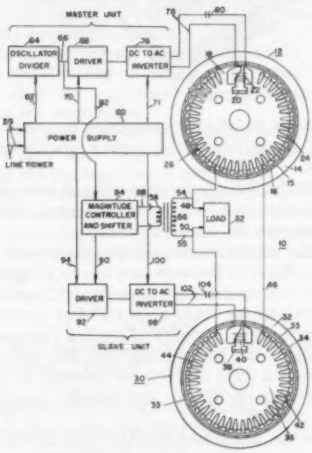
ing supply and to provide a visual indication of operation of said charging circuit.

4,177,414

CONTROLLABLE VOLTAGE A.C. GENERATOR SYSTEM

John F. Roesel, Jr., Bradenton; Richard R. Ott, Sarasota, and Ronnie J. Barber, Bradenton, all of Fla., assignors to Precise Power Corporation, Bradenton, Fla.

Filed Dec. 21, 1977, Ser. No. 862,813
Int. Cl.[2] H02P *9/42*
U.S. Cl. 322—28 **13 Claims**



1. A generator system for producing sine wave A.C. of a substantially constant selected frequency and of a substantially constant selected voltage, comprising a rotating master generator for generating a sine wave A.C. potential of a substantially constant selected frequency, at least one other rotating slave generator for generating sine wave A.C. of an identical frequency to that of the master generator, the A.C. potential output of the master generator being combined in series with that of the said other slave generator, electrical means for phase shifting of the A.C. potential output of the slave generator with respect to that of the master generator so that the combined A.C. potentials of both generators is a sine wave A.C. having the selected voltage.

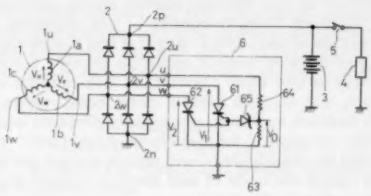
7. In a voltage control system for combining in series the outputs of a master generator and at least one slave generator each producing sine wave A.C. potentials of an identical frequency, means for determining the peak voltage of the combined sine wave A.C. voltage output of the generators for a brief interval at one-quarter of a wave length after the zero point thereof, means for comparing such peak voltage with a selected voltage and for producing an electrical signal proportional to the difference therebetween, supplying such electrical difference signal to means for causing the phase of the sine wave A.C. potential output of the slave generator to be shifted by an amount proportional to said signal with respect to the sine wave A.C. potential output of the master generator, whereby the resultant combined series voltage is substantially the selected voltage.

4,177,415

VOLTAGE REGULATOR FOR USE WITH A POLYPHASE MAGNETO GENERATOR

Hideki Yukawa, Susono, Japan, assignor to Kokusan Denki Co., Ltd., Numazu, Japan

Filed Apr. 19, 1978, Ser. No. 897,866
Claims priority, application Japan, Apr. 22, 1977, 52-50300
Int. Cl.[2] H02J *7/14*; H02P *9/00*
U.S. Cl. 322—28 **5 Claims**



1. A voltage regulator for use with a polyphase magneto generator and in combination with a rectifier circuit provided to rectify the output of the generator to charge a battery, said voltage regulator comprising:

at least two thyristors having the anodes respectively connected to the AC output terminals of the generator having phases adjacent to each other, having the cathodes connected to the negative output terminal of the rectifier circuit, and having the gates connected to each other, and

trigger means adapted to supply gate signals to the gates of said thyristors when the voltage of the output terminal having a phase in advance of the phases of the output terminals to which the anodes of said thyristors are connected exceeds a predetermined value,

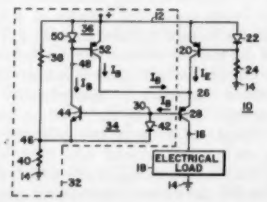
whereby as the terminal voltage of the battery is excessive said thyristors are rendered conductive to short-circuit the output of the generator.

4,177,416

MONOLITHIC CURRENT SUPPLIES HAVING HIGH OUTPUT IMPEDANCES

William F. Davis, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 9, 1978, Ser. No. 885,064
Int. Cl.[2] G05F *1/56*
U.S. Cl. 323—4 **12 Claims**



1. A high resistance current supply circuit for providing a current having a substantially constant magnitude, the high resistance current supply circuit having an output terminal for being coupled to an electrical load, the electrical load providing a voltage of variable magnitude to the output terminal, the high resistance current supply circuit including in combination:

power supply conductor means;

electron control means having input, output and control electrodes, said output electrode of said electron control means being coupled to the output terminal of the high resistance current supply circuit, said electron control means tending to provide an output current at said output electrode thereof and a control current at said control electrode thereof having magnitudes which undesirably tend to correspond to variations in the magnitude of the voltage provided by the electrical load at the output terminal;

circuit means coupling said input electrode of said electron control means to said power supply conductor means; and

feedback circuit means having input and output terminals, said input terminal being connected to said control electrode of said electron control means, said output terminal of said feedback means being connected to said input electrode of said electron control means, said feedback circuit means being responsive to said variations of the magnitude of said control current at said control electrode of said electron control means to provide a feedback current to said input electrode of said electron control means, said electron control means being responsive to said feedback current to substantially eliminate said undesirable variations in the magnitudes of said control current so that the magnitude of said output current provided at said output electrode of said electron control means remains substantially constant.

4,177,417

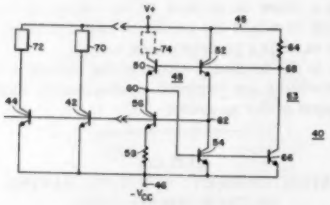
REFERENCE CIRCUIT FOR PROVIDING A PLURALITY OF REGULATED CURRENTS HAVING DESIRED TEMPERATURE CHARACTERISTICS

Paul M. Henry, Chandler, and William J. Lillis, Tempe, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 2, 1978, Ser. No. 882,710

Int. Cl.[2] G05F *1/56*

U.S. Cl. 323—4 **11 Claims**



1. A circuit for providing a plurality of output currents of a regulated magnitude which have a predetermined temperature coefficient, including in combination:

reference cell means having resistive means and a plurality of bipolar transistors each having an emitter, a base and a collector, the base-to-emitter junctions of said plurality of transistors being connected serially in a loop with one another and with said resistive means such that the summation of the base-to-emitter voltages thereof develops a reference current in said resistive means, the magnitudes of the collector currents of said plurality of transistors being substantially equal to one another, and the base-to-emitter voltages of pairs of said plurality of transistors opposing each other around said loop, such that said reference current has a magnitude which is substantially proportional to the ratio of the emitter areas of at least a pair of said plurality of transistors and to the absolute temperature of said transistors;

a plurality of controlled current supply means connected to said emitter of one of said plurality of transistors so that said one of said plurality of transistors operates as an emitter-follower for enabling the plurality of output currents to be provided by said plurality of controlled current supply means, said emitter of said one of said plurality of transistors being further coupled to the collector of another one of said plurality of transistors; and

bias circuit means connected to said another one of said plurality of transistors for providing a bias voltage of a desired magnitude thereto and which enables said plurality of output currents to have the desired temperature coefficient.

4,177,418

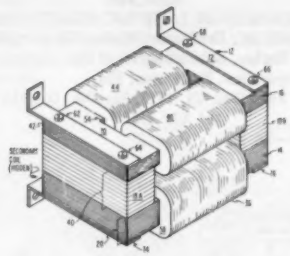
FLUX CONTROLLED SHUNT REGULATED TRANSFORMER

Karl H. Brueckner; Charles A. Farel, both of Boulder, and Johnnie F. Irsik, Longmont, all of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 4, 1977, Ser. No. 821,893

Int. Cl.[2] G05F *1/46*; H01F *27/24, 31/00*

U.S. Cl. 323—56 **8 Claims**



1. A regulating transformer comprising in combination:

a main "O" shaped core for supporting primary and secondary coils:

a shunt "O" shaped core for supporting at least one control coil; said shunt core being positioned in spaced juxtaposed alignment with the main core;

separate flux interconnecting means placed such that the magnetic flux from the main core travels at right angles to said flux interconnecting means for interconnecting the main core and the shunt core; said flux interconnecting means including a plurality of stacked I-shaped laminations placed such that the magnetic flux from the main core travels at right angles to the plurality of laminations and also being operable to mechanically couple the main and shunt cores;

fastening means, interconnecting the cores and flux interconnecting means, operable to give structural strength to said transformer; and

mounting means operable for mounting said transformer.

4,177,419

TEST APPARATUS FOR CHECKING THE RESPONSE OF PROTECTIVE RELAYS

Michael Fiorentzis, Wettingen, Switzerland, assignor to BBC Brown Boveri & Company Ltd., Baden, Switzerland

Continuation-in-part of Ser. No. 773,074, Feb. 28, 1977, abandoned. This application Dec. 4, 1978, Ser. No. 966,491

Claims priority, application Switzerland, Mar. 15, 1976, 3164/76

Int. Cl.[2] G01R *31/02*

U.S. Cl. 324—418 **8 Claims**

1. A test apparatus for checking of test objects, typically protective relays, especially voltage, current and frequency relays for protecting a generator of a power supply network, comprising:

a first circuit for producing and transforming the test magnitudes which are to be delivered to the test objects;

a second circuit for pre-programming the test magnitudes which are to be delivered to the test objects;

a signal and control device for controlling the course of the test;

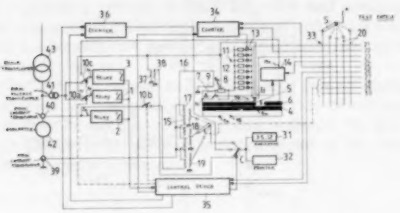
a measuring device for measuring relay-response values;

said first circuit comprising a first test signal generating circuit for supplying a voltage relay and current relay with voltage test magnitudes and current test magnitudes, respectively;

said first test signal generating circuit comprising a test transformer having a secondary winding and a primary winding;

said first test signal generating circuit further comprising a static potentiometer connected in parallel with the secondary winding;

said static potentiometer comprising a combination of resis-



tors and electronic switches connected in circuit with one another for delivering test magnitudes to the test objects in finely graduated values;

means for controlling said static potentiometer;

said first circuit further containing a second test signal generating circuit for supplying a frequency relay with frequency test magnitudes;

said second circuit for pre-programming the test magnitudes containing a test matrix for supplying information concerning the test magnitudes; and

said signal and control device being operatively connected with said test matrix and receiving said information therefrom and storing a predetermined test course-program and controlling the test course in accordance with said program.

4,177,420

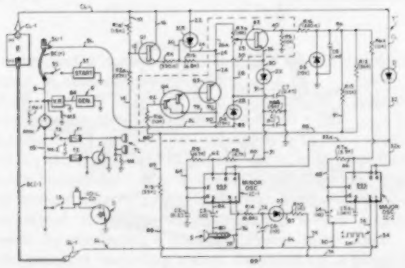
MAJOR AND MINOR SHORT LEAKAGE DETECTOR

Charles W. Tripp, 15241 Oak Ridge Way, Los Gatos, Calif. 95030

Continuation-in-part of Ser. No. 851,593, Nov. 14, 1977, abandoned. This application May 8, 1978, Ser. No. 903,536

Int. Cl.[2] G01R *31/02*

U.S. Cl. 324—51 **27 Claims**



1. A short circuit detector for battery powered circuits such as those employed in vehicles or the like wherein one battery cable is connected to the circuit and the other is grounded, said tester being of the type connected in series with the battery and having a current lead for connection to one battery terminal from which the battery cable has been disconnected, a sensor lead for connection to the disconnected cable, current dissipating means connected for conducting high currents across said leads caused by a major short and signal means for audibly indicating the presence of said short by one tone; the improvement wherein said detector has a ground connection, said current dissipating means offering a resistance of less than one ohm to minor short currents as low as a few milliamperes, main switch means in series with said current dissipating means across said leads, voltage dropping trigger resistance means connected across said leads, trigger switch means connected to sense a voltage drop in said trigger resistance means and to one of said leads for turning said main switch means on in response to the current drawn through said trigger resistance means by a minor short current of less than one ampere thereby independently energizing the circuit under test, said signal means having a discriminator control circuit having means for sensing the amount of current flowing through said main switch means and said current dissipating means and connected to said signal means for turning the latter on, said signal means having means for producing a different tone from said one tone, for signalling said minor short when said main switch means is turned on and means for powering said signal means from said current lead.

4,177,421

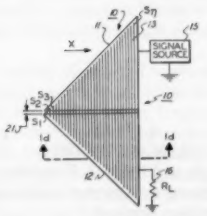
CAPACITIVE TRANSDUCER

David D. Thornburg, Los Altos, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Feb. 27, 1978, Ser. No. 881,287

Int. Cl.[2] G01R *27/26*

U.S. Cl. 324—61 R **20 Claims**



1. A capacitive transducer comprising at least two plate electrodes aligned along a main axis in spaced juxtaposed relation, a substantially parallel array of segmented electrodes each of smaller dimensional width than said plate electrodes and aligned in a direction transverse to said main axis overly said plate electrodes but separated therefrom by dielectric means, said segmented electrodes capacitively coupled to said plate electrodes in an increasing capacitive and monotonic manner from one end of the transducer to the other along said main axis.

4,177,422

APPARATUS AND PROCESS FOR GENERATING AN IONIZED GAS OR PLASMA BY MICROWAVE ENERGY

Alain Deficis; Marie-Edith Gimonet, both of Ramonville Saint-Agne; Alain Priou, Castanet-Tolosan, and Christian Fournet-Fayas, Fenouillet, all of France, assignors to Agence Nationale de Valorisation de la Recherche (A.N.V.A.R.), Neuilly-sur-Seine, France

Filed Nov. 18, 1977, Ser. No. 852,748

Claims priority, application France, Nov. 19, 1976, 76 35308

Int. Cl.[2] G01R *21/04, 19/00*

U.S. Cl. 324—95 **16 Claims**

1. A device for the generation of an ionized gas for measurement of ultra-high frequency electromagnetic radiation comprising a sealed casing containing an ionizable gas, an oscillating circuit comprising an inductor connected across a capacitor in said casing, said inductor and capacitor being adapted to resonate at a predetermined resonance frequency F_o in the

ultra-high frequency range and to have a Q factor in a vacuum Q_o of greater than 1, in order to render said circuit capable of providing a firing voltage across said capacitor for ionizing said gas when said inductor receives electromagnetic radiation near the frequency F_o, optical conducting means having one

end attached to said casing near said capacitor, and means attached to the other end of said optical conducting means for analyzing light transmitted from said conductor and driving a signal representative of the power of the electromagnetic radiation.

4,177,423

BRIDGE CIRCUITS

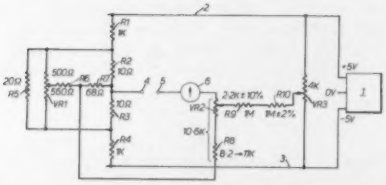
Roy C. Turner, Slough, and Philip J. Constable, Uxbridge, both of England, assignors to Drayton Controls (Engineering) Limited, West Drayton, England

Filed Jul. 6, 1977, Ser. No. 813,254

Claims priority, application United Kingdom, Jul. 7, 1976, 28322/76

Int. Cl.[2] G01R *17/06, 17/00, 27/02;* **G01K** *7/14*

U.S. Cl. 324—99 R **12 Claims**



1. A measuring bridge circuit comprising first and second standard resistance means in series between two bridge supply terminals, third and fourth series-connected resistance means including the track of a balancing potentiometer having a slider and connected in parallel with the series-connected first and second resistance means, fifth resistance means connected from the slider of the potentiometer by way of sixth resistance means to the junction of the first and second resistance means, the resistance of the fifth resistance means being high compared with the resistance of the sixth resistance means, a balance detector and means for connecting a voltage to be measured and the balance detector in series between the junction of the first and second resistance means and the junction of the fifth and sixth resistance means.

4,177,424

METHODS OF AND A CIRCUIT FOR MONITORING THE AMPLITUDE OF SINE WAVE-SHAPED SIGNALS

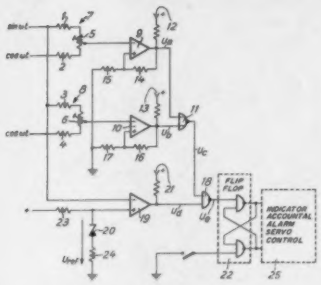
Siegfried Knittel, Naunheim, Fed. Rep. of Germany, assignor to Ernst Leitz Wetzlar GmbH, Wetzlar, Fed. Rep. of Germany

Filed May 31, 1977, Ser. No. 801,909

Claims priority, application Fed. Rep. of Germany, Jun. 2, 1976, 2624711

Int. Cl.[2] G01R *19/16, 19/00;* **H03K** *5/20*

U.S. Cl. 324—102 **7 Claims**



1. A method of monitoring the amplitude of one of a plurality of sine-wave shaped electrical signals in a predetermined time interval of the signal period wherein said plurality of sine-wave shaped signals is derived from scanning an object which is to be measured or controlled, said method comprising the steps of:

(a) comparing the voltage of the signal being monitored with the voltage of a reference signal to produce a first pulse;

(b) producing a second pulse determinative of said predetermined signal time interval by adding to said monitored signal at least one signal contained in said plurality of sine-wave shaped signals and phase shifted with respect to said monitored signal; and

(c) combining said first and second pulses in logic means to produce a signal for operating output means in response to said monitored signal.

4,177,425

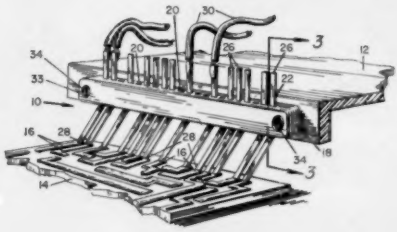
MULTIPLE CONTACT ELECTRICAL TEST PROBE ASSEMBLY

Seymour Lenz, P.O. Box 104, Altamonte Springs, Fla. 32701

Filed Sep. 6, 1977, Ser. No. 830,424

Int. Cl.[2] G01R *1/06, 31/02*

U.S. Cl. 324—158 P **11 Claims**



1. A multiple contact electrical test probe assembly for contacting and testing miniature electronic circuit devices lying in a first plane, said assembly comprising:

a support of an electrically non-conductive material, said support having a plurality of spaced holes extending through said support from one side of said support to an opposing side thereof all of said holes being substantially

parallel and lying in a common plane which is substantially normal to said first plane;

a plurality of electrically conductive contact elements, each element dimensioned to a press fit within at least one of said holes and having a bend between the ends thereof to restrict sliding through the corresponding hole;

at least a first end of each said contact element adapted to sequentially engage a plurality of miniature electronic circuit devices for testing purposes;

each contact element having sufficient tensile strength to withstand said sequential testing of said circuit devices;

means for mounting said assembly in space relationship with said circuit device being tested;

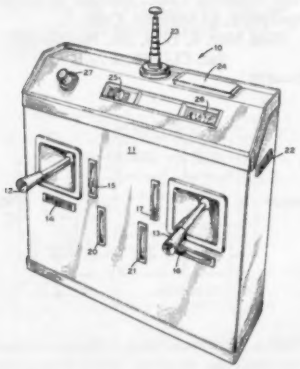
wherein each said bend is positioned between said support and said circuit device being tested, and separates said corresponding contact element into two end portions, a first end portion including said first end and being longer than the second end portion which includes said second end; and wherein

both said first and second ends of each said contact element is adapted to sequentially engage a plurality of miniature electronic circuit devices for testing purposes, by sliding from the corresponding hole and reversal of the corresponding contact element.

4,177,426
RADIO CONTROL SYSTEM WITH PLUGGABLE MODULES FOR CHANGING SYSTEM OPERATING FREQUENCY

Rudolph M. Gaishin, St. Joseph, and Garry C. Covert, Baroda, both of Mich., assignors to Heath Company, Benton Harbor, Mich.

Filed Oct. 30, 1975, Ser. No. 627,425
Int. Cl.² H04B *7/00*
U.S. Cl. 325—37 **19 Claims**



1. A radio control system for remote control of a mechanism comprising, in combination:

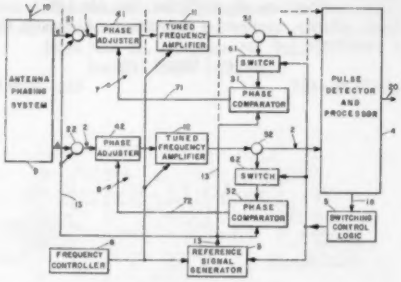
a radio transmitter including means mounted on a pluggable transmitter module to generate a radio signal at a first frequency and a modulation circuit to produce a modulation signal, said generating means and said modulation circuit being interconnected by a first disengageable plug and receptacle connection means to couple said modulation signal to said generating means which responds thereto by producing a modulated radio signal; and

a radio receiver including means mounted on a pluggable receiver module to receive and convert said modulated radio signal into a modulated signal at a second frequency, a demodulator responsive to signals at said second frequency to remove the modulation therefrom to control said mechanism, and a second disengageable plug and receptable connection means to interconnect said means to receive and convert with said demodulator, said transmitter and receiver modules cooperating to enable operation of said system at said first frequency when they are jointly plugged into said transmitter and receiver, respectively.

4,177,427
PHASE-NORMALIZED PARALLEL TUNED RECEIVER CHANNEL SYSTEM

Marvin W. Shores, Pomona, Calif., assignor to General Dynamics Corporation, Pomona, Calif.

Filed Apr. 3, 1978, Ser. No. 892,527
Int. Cl.² H03D *3/00*; H04B *1/06*
U.S. Cl. 325—369 **3 Claims**



1. A system having a plurality of parallel tuned receiver channels, wherein a normalized phase relationship is maintained in the respective channels between amplified pulsed high frequency carrier signals having a given frequency, comprising

a plurality of parallel channels for receiving pulsed high frequency carrier signals from disparate sources, wherein each channel includes a tuned frequency amplifier for amplifying a given frequency component of a signal in the channel within a predetermined bandwidth;

a reference signal generator for generating a continuous wave reference signal having the given frequency; and

an individual phase control loop for each of the channels for locking the amplified signal in the channel to the phase of the reference signal, wherein each phase control loop includes

a first in-line circulator connected in the channel before the input of the tuned frequency amplifier for inserting the reference signal into the loop;

a phase comparator for comparing the phase of the reference signal components of the amplfied signal with the phase of the reference signal;

a phase adjuster controlled by the phase comparator and connected in the channel between the circular and the tuned frequency amplifier for adjusting the phase of the signal from the circulator in response to said phase comparison;

a second in-line circulator connected in the channel following the output of the amplifier; and

a switch connected to the second in-line circulator for providing the amplifier signal to the phase comparator;

wherein the system further comprises

a pulse detector and processor circuit for receiving the amplified signals from the plurality of channels and for detecting coherent pulsed signals in the received amplified signals; and

a switching control logic circuit connected to the signal detector and processor circuit, to the reference signal generator, and to each of the switches for enabling the reference signal generator to provide the reference signal, and for enabling the switches to provide the amplified signals in the plurality of channels to all of the respective channel phase comparators simultaneously during a predetermined interval in response to detection of a said

coherent pulsed signal by the pulse detector and processor circuit, thereby causing said phase adjustments in the separate channels to be made simultaneously to normalize the phase shift between the reference signal and the amplified signals in the plurality of channels.

4,177,428

CIRCUIT ARRANGEMENT FOR AMPLIFYING OSCILLATOR OSCILLATIONS AND CONVERTING SAME TO RECTANGULAR SIGNALS

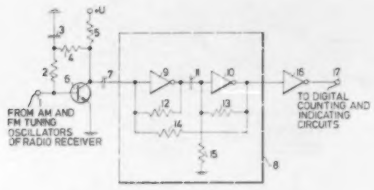
Otto Klank, Arpke, Fed. Rep. of Germany, assignor to Licentia Patent-Verwaltung-G.m.b.H., Frankfurt, Fed. Rep. of Germany

Filed Sep. 19, 1977, Ser. No. 834,448

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1977, 2641782

Int. Cl.² H04B 1/06

U.S. Cl. 325—455 **9 Claims**



1. In a circuit arrangement for digitally indicating the frequency to which a radio receiver having both an AM tuning oscillator and an FM tuning oscillator is tuned, said circuit arrangement including means for coupling the output signals from said AM and FM oscillators to the input of a common broadband amplifier which has a bandwidth sufficiently broad so as to pass and amplify signal frequencies from both the AM and FM tuning oscillators and which converts the amplified output signals from said oscillators into rectangular signals, said coupling means sufficiently loosely coupling the output signals from said AM and said FM tuning oscillators to the common input of said broadband amplifier so that said tuning oscillators are not noticeably detuned by changes in capacitance of said broadband amplifier, and digital counting and indicating means for counting the frequency of said rectangular signals and for providing a digital indication of the frequency to which the particular tuning oscillator is tuned; the improvement wherein said common broadband amplifier comprises first and second inverters, each having a fast rise-time, which are each designed as an integrated circuit and which are connected in series with one another via a capacitance; and means for applying a respective bias voltage to the input of each of said inverters so that the operating point of each of said inverters lies on the steep portion of the curve indicating the relationship between the input voltage and the output voltage of the inverter, said means for applying a respective bias voltage including a resistive voltage divider connected from the output of said second inverter to a point of reference potential with said voltage divider having its tap connected with said input of said second inverter, which is connected behind said first inverter, to generate the biasing voltage for said second inverter.

4,177,429

SWITCHING ARRANGEMENT FOR COMBINATION VHF-UHF TUNERS

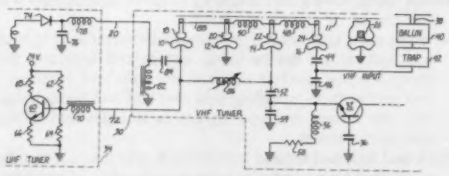
Alarico A. Valdettaro, Bloomington, Ind., assignor to Sarkes Tarzian, Inc., Bloomington, Ind.

Filed Dec. 14, 1977, Ser. No. 860,485

Int. Cl.² H04B 1/06

U.S. Cl. 325—459 **9 Claims**

1. A television tuner arrangement for receiving both VHF and UHF television signals, comprising a common VHF and UHF station selector shaft, detent means for establishing a plurality of equally spaced detent positions for said selector shaft, VHF tuner means for selecting different VHF stations in the VHF band in alternate detent positions of said selector shaft, UHF tuner means connected to said selector shaft and effective to receive any one of the seventy UHF stations in the detent positions between said alternate detent positions upon rotation of said selector shaft through a plurality of revolutions, said UHF tuner means including an IF output circuit and a transistor oscillator having a base and a collector, means for



continuously supplying a unidirectional supply potential to said collector, said VHF tuner means including a fixed stator member carrying a plurality of stator contacts, means carried by said selector shaft for supporting a plurality of tuning panels, means permanently connecting a first one of said stator contacts to said base and to said IF output circuit, means permanently connecting a second one of said stator contacts to ground, and means carried by each of said tuning panels for electrically connecting said first and second stator contacts together in said alternate detent positions of said selector shaft.

4,177,430

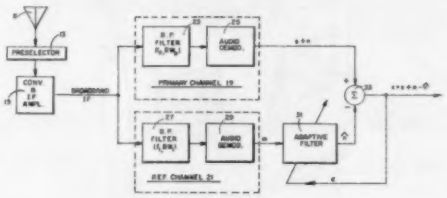
ADAPTIVE NOISE CANCELLING RECEIVER

James E. Paul, Anaheim, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Mar. 6, 1978, Ser. No. 884,093

Int. Cl.² H04B 1/12

U.S. Cl. 325—475 **16 Claims**



1. An adaptive noise cancelling receiver comprising:

means responsive to received radio frequency signals for selectively developing a desired broadband frequency signal containing a desired signal;

a first frequency channel responsive to the broadband frequency signal for generating a first audio signal in a first band of frequencies containing the desired signal in the presence of a first broadband noise;

a second frequency channel responsive to the broadband frequency signal for generating a second audio signal in a second band of frequencies containing a second broadband noise which is correlated with the first broadband noise;

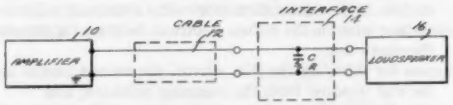
an adaptive filter responsive to the second broadband noise and to an output audio signal for adaptively developing an estimate of the first broadband noise; and

means for combining the estimate of the first broadband noise with the first audio signal to substantially cancel out the first and second broadband noises and develop the output audio signal, said output audio signal substantially containing only the desired signal.

4,177,431
LOUDSPEAKER-CABLE INTERFACE

Matthew S. Polk, Jr., 34 E. Melrose Ave., Baltimore, Md. 21212

Filed Mar. 17, 1978, Ser. No. 887,740
Int. Cl.[2] H03F *1/26*
U.S. Cl. 330—149 9 Claims



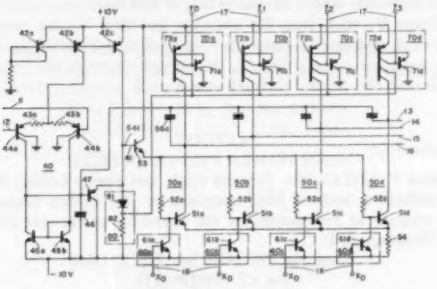
1. In an audio reproduction system of the type including an amplifier, at least one remote speaker unit, and a cable of predetermined characteristic impedance electrically connecting said remote speaker unit to said amplifier, said system having a tendency to generate spurious higher than audio frequency signals and a tendency to reflect said signals within the cable, said reflected signals passing through said cable to said amplifier, the improvement wherein said system further comprises:

interface means, interposed at the end of said cable between said cable and said speaker, for terminating said cable with a predetermined impedance at said higher than audio frequencies to inhibit generation of said spurious higher than audio frequency reflected signals, said predetermined impedance including a resistive component on the order of said characteristic impedance and a capacitive component of low value at said higher than audio frequencies.

4,177,432
MULTI OUTPUT DIFFERENTIAL AMPLIFIER

Stephen W. Hobrecht, Sunnyvale, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Jun. 26, 1978, Ser. No. 919,160
Int. Cl.[2] H03F *3/45;* H03C *3/68*
U.S. Cl. 330—252 9 Claims



1. A multi-output differential amplifier integrated on a semiconductor substrate comprising;

input terminal means for simultaneously receiving a pair of analog voltages;

first transistor means connected to said input terminal means for generating an analog signal representative of any voltage difference between said pair;

a plurality of output terminal means;

a plurality of output transistors, each of said transistors having a base coupled to receive said analog signal and having a collector coupled to a respective one of said output terminal means;

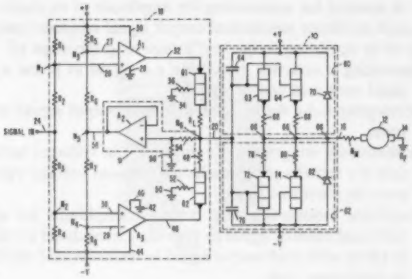
a plurality of selectively activated current source means coupled respectively to the collectors of said output transistors for supplying current to selectable ones of said collectors in response to output selection signals; and

a plurality selectively activated current sinking means coupled respectively to the bases of said output transistors for sinking current from selectable ones of said bases in response to said output selection signals.

4,177,433
REEL MOTOR PREAMPLIFIER

Robert J. Christopher, Boulder, Colo., and Robert L. Schaaf, Tucson, Ariz., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 20, 1978, Ser. No. 962,278
Int. Cl.[2] H03F *3/20, 3/68*
U.S. Cl. 330—265 6 Claims



1. A bipolar amplifier circuit for supplying bipolar signals to a load, said amplifier circuit comprising in combination:

a preamplifier stage having an output terminal; and

a power amplifier stage having an input terminal connected in tandem with the output terminal of the preamplifier stage and an output terminal to supply a high voltage/-high current signal to the load;

said preamplifier stage including a first signal operational amplification means;

a second signal operational amplification means interconnected in parallel with the first signal amplification means;

a first signal dividing means interconnecting a first input of the first and second amplification means; said signal dividing means being operable for receiving a bipolar signal and providing a unipolar signal therefrom;

a pair of switching means one of each positioned in the output terminal of the first and second amplification means; each of said switching means being operable to regulate an electrical characteristic of the associated amplification means;

a second signal dividing means interconnecting a second input of the first and second amplification means and operating as a voltage divider to provide a unipolar signal to each of the first and second amplification means;

a gain controlled loop interconnecting the output of said switching means to the second signal dividing means to direct a portion of the bipolar output signal to said second signal dividing means to control the first and second amplification means such that the signal amplification of the activated amplification means is supported;

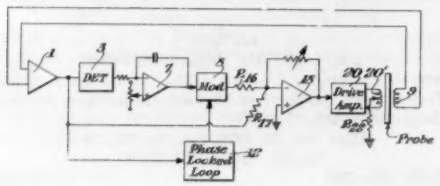
said power amplifier stage including a third signal amplification means;

a fourth signal amplification means connected in parallel, at a common node, with the third amplification means whereby each of the third and fourth signal amplification means are arranged in a parallel configuration to maximize signal amplification.

4,177,434
CONSTANT AMPLITUDE CONTROL OF ELECTROMECHANICAL OSCILLATORS

Edward S. Ida, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 30, 1978, Ser. No. 910,849
Int. Cl.[2] G01N *11/16*; H03B *5/30, 3/02*
U.S. Cl. 331—27 5 Claims



1. A method for maintaining the amplitude of an electromechanical oscillator mechanical output signal constant independent of its operating frequency, comprising the steps of:

generating a constant amplitude a-c signal in phase agreement with said output signal;

developing a d-c signal related to said output signal amplitude;

continuously integrating the difference in voltages between said d-c signal and a preselected setpoint voltage value to provide a control signal;

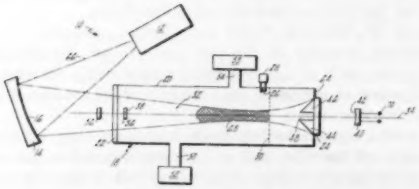
amplitude modulating said constant amplitude a-c signal with said control signal to provide a modulated a-c signal in phase with said output signal to maintain said oscillator in oscillation; and

maintaining the amplitude of said output signal in accordance with the algebraic sum of a linear negative feedback signal derived from said output signal and said modulated a-c signal, thereby to maintain said output signal amplitude constant.

4,177,435
OPTICALLY PUMPED LASER

Robert T. Brown, Manchester, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Oct. 13, 1977, Ser. No. 841,866
Int. Cl.[2] H01S *3/097*
U.S. Cl. 331—94.5 G 26 Claims



1. An electrical discharge laser comprising:

a source of pumping radiation for creating a population inversion in a gaseous gain medium;

a gain medium comprising at least one of the rare gases and at least one of the halide gases;

a cell for containment of the gain medium wherein the cell includes an input window substantially transmissive at the wavelength of the pumping radiation and an exit window which is substantially transmissive at the ultraviolet and visible wavelengths between 0.25 and 0.60 microns wherein the input window and exit window are positioned on a beam axis;

means for passing the gain medium through the cell;

ionization means for creating a low level of electron density in at least some of the gain medium in the cell;

means for concentrating the pumping radiation into a volume occupied by ionized gain medium to produce a diffuse electrical discharge;

an optical resonator positioned on and symmetrically about the beam axis having a first mirror with a first reflective surface and a second mirror with a second reflective surface wherein the diffuse electrical discharge is disposed therebetween;

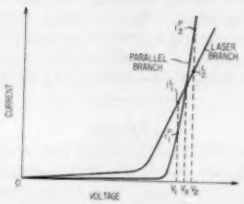
means for shielding the first mirror, the second mirror and the exit window from the pumping radiation; and

means for coupling a beam of output radiation from the resonator.

4,177,436
CIRCUIT FOR CONTROLLING THE DIFFERENTIAL OUTPUT POWER OF A SEMICONDUCTOR LASER

Richard W. Dixon, Bernardsville, and Joseph F. Svacek, III, Jamesburg, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 5, 1977, Ser. No. 857,585
Int. Cl.[2] H01S *3/13*
U.S. Cl. 331—94.5 S 12 Claims

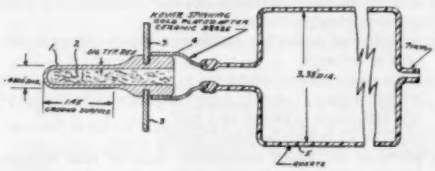


1. A circuit for controlling the output of a semiconductor laser comprising, in parallel with said laser, a circuit branch including a threshold device and having a current-voltage characteristic which intersects that of said laser at a cross-over voltage V_X such that, for voltages less than V_X the current through said laser exceeds that through said branch, whereas for voltages greater than V_X the current through said laser is less than the current through said branch.

4,177,437
HIGH POWER PRE-TR SWITCH

James F. McLaughlin, Severna Park, and Harry Goldie, Randallstown, both of Md., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 20, 1978, Ser. No. 871,066
Int. Cl.[2] H01P *1/14*
U.S. Cl. 333—13 1 Claim



1. A high power pre-TR switch comprising

a machined, hot pressed boron nitride vial,

a reservoir vessel sealably connected thereto, said vial and said reservoir vessel defining a hermetically sealed enclosure,

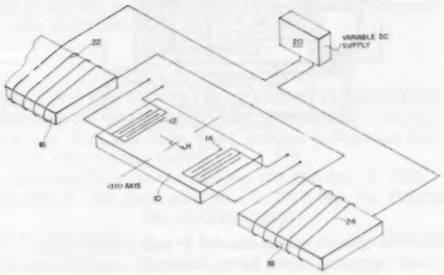
a halogen in said vial, and heat sink means affixed to said vial.

4,177,438

SURFACE ACOUSTIC WAVE MODULATOR USING SINGLE CRYSTAL FILMS OF LITHIUM FERRITE

Carmine Vittoria, Bowie, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 18, 1978, Ser. No. 925,726
Int. Cl.[2] H03H *9/26, 9/30;* H03C *3/38;* H01L *41/12*
U.S. Cl. 333—152 8 Claims



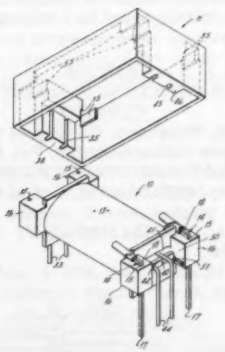
1. A continuously tunable SAW device comprising:
a slab of material comprising a unitary piece of magnetostrictive, insulating crystalline material having at least one flat surface;
input transducer means mounted on said flat surface of said slab of material for propagating an acoustic wave along said flat surface of said slab of material;
output transducer means mounted on the same flat surface of said slab of material as said input transducer and spaced therefrom for receiving said acoustic wave propagated by said input transducer; and
means for applying a variable dc magnetic field in the direction of and along the propagation path of said acoustic wave for varying the propagation time of said acoustic wave between said input and output transducer means.

4,177,439

REED RELAY AND METHOD OF ASSEMBLY

Philip N. Smith, Cincinnati, Ohio, assignor to Standex International Corporation, Andover, Mass.

Filed Feb. 27, 1978, Ser. No. 881,697
Int. Cl.[2] H01H *51/27, 11/00, 1/66*
U.S. Cl. 335—151 12 Claims



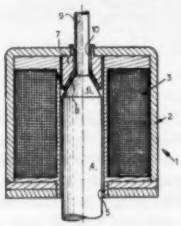
1. A reed relay comprising,
a hollow bobbin having a large opening at one end and a small opening at the other end, at least one switch enclosed in a glass envelope and having leads projecting from both ends, said switch being inserted into said bobbin with leads projecting through said openings,
said small opening including a transverse shoulder upon which said projecting lead rests,
said bobbin having a tab hinged across said large opening and adapted to swing up into position to provide a shoulder across said large opening upon which said projecting lead rests, said hinged tab thereby permitting a large opening for switch insertion while providing a lead supporting shoulder after said switch has been inserted into said bobbin,
and a housing for said bobbin.

4,177,440

MOVING-ARMATURE ELECTROMAGNETIC DEVICE

Didier Merlette, Mouy, France, assignor to Techniques Europeennes de Commutation (T.E.C.), Mouy, France

Filed Jul. 31, 1978, Ser. No. 929,359
Claims priority, application France, Aug. 5, 1977, 77 24241
Int. Cl.[2] H01F *7/12*
U.S. Cl. 335—247 6 Claims



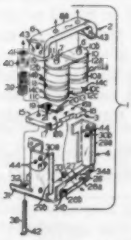
1. A moving-armature electromagnetic device comprising: a moveable core; a seat portion engageable by an end of said core to close the magnetic flux lines when the device is energized, said seat portion and said end of said core having complementary tapered surfaces; and a non-magnetic anti-friction ring positioned between said core and said seat to reduce the frictional forces and the magnetic remanence forces between said core and said seat.

4,177,441

ELECTROMAGNETIC STRUCTURE FOR A VITAL RELAY

William J. Lichtenberger, Murrysville, Pa., assignor to Westinghouse Air Brake Company, Swissvale, Pa.

Filed May 5, 1978, Ser. No. 903,373
Int. Cl.[2] H01F *7/08*
U.S. Cl. 335—270 10 Claims



1. An electromagnetic device comprising, a U-shaped electromagnet, a spring biased armature, and a unitary metallic frame fixedly attached to said U-shaped electromagnet, said unitary metallic frame includes an apertured portion for accommodating the back side of said spring biased armature and establishing a floating hinge joint between said apertured portion and said back end of said spring biased armature, and said unitary metallic frame includes a fulcrum point about which

said spring biased armature teeters to urge the back end of said spring biased armature into close proximity of said U-shaped electromagnet to minimize the air gap when the said U-shaped electromagnet is deenergized.

4,177,442

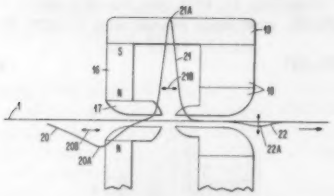
PRODUCTION OF MAGNETIC MEDIA

Geoffrey Bate, and Larry P. Dunn, both of Boulder County, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation-in-part of Ser. No. 609,113, Aug. 29, 1975, abandoned. This application Sep. 26, 1977, Ser. No. 836,823

Int. Cl.[2] H01F *10/02*

U.S. Cl. 335—284 **4 Claims**



1. In a method of orienting magnetic particles on a medium during relative movement of the medium with respect to a permanent magnet assembly, the improvement comprising:

providing said magnet assembly having first and second spaced sections defining a path therebetween, each section having a large pole and a small pole with a gap therebetween and a shunt interconnecting said poles, said poles flaring outwardly at their ends away from the gap, choosing the magnets of each section to have essentially the same magnetic remanence;

arranging the magnetic material in each section entirely on the side of the small pole to create a first unfocused magnetic field at the small pole along the path of travel of the medium, a second focused magnetic field at the gap greater in intensity and opposite in the direction from the first field along the path of travel of the medium, and a third magnetic field at said larger pole; and

providing antennae means on the section extending from the gap a distance at least equal to the length of the magnetic assembly said antennae means being longer than the permanent magnet alone and at one or more points being further removed from the medium than any magnetic pole to attenuate the intensity of the third field to an intensity less than that of the first field and in the same direction in the plane of the path of travel of the medium, and maintaining a minimal vertical field component normal to the plane of the path of travel no greater in magnitude than the third field by providing the magnetic material on both sides of the path of travel of the medium, and moving said media containing magnetic particles on said path through said first, second, and third fields successively, maintaining said path of travel essentially midway between said spaced sections,

whereby to align the particles on a plane on said media without a substantial subsequent disorienting field.

4,177,443

THERMAL RELAY AND ELECTRIC RANGE CONTROL UTILIZING THE SAME

Steven A. Willeke, Mansfield, Ohio, assignor to Essex Group, Inc., Fort Wayne, Ind.

Filed Mar. 31, 1978, Ser. No. 892,437

Int. Cl.[2] H01H *71/16, 71/22*

U.S. Cl. 337—101 **8 Claims**

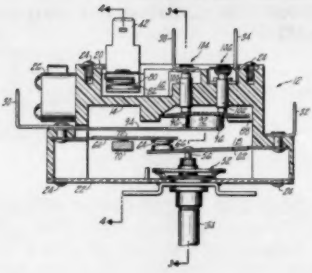
1. A thermal relay comprising:

a housing;

a thermally responsive snap disc situated in said housing;

an electrical heater mounted directly upon said thermally responsive snap disc;

temperature compensating means acting upon said thermally responsive snap disc through said electrical heater;



electrical contact means situated in said housing; and

contact operating means for mechanically coupling said snap disc and electrical contact means.

4,177,444

TIME LAG FUSE

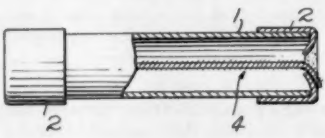
Minoru Taki, Yokohama, Japan, assignor to Fukada Works, Ltd., Tokyo, Japan

Filed Mar. 23, 1978, Ser. No. 889,505

Claims priority, application Japan, Aug. 8, 1977, 52-1051625[U]

Int. Cl.[2] H01H *85/04*

U.S. Cl. 337—163 **5 Claims**



1. A time lag fuse comprising a fuse barrel having a conductive cap attached at each end of the fuse barrel and a fuse element within said fuse barrel and connected between said caps, wherein said fuse element is comprised of a core cord of insulating fibers spirally bound by a melting element.

4,177,445

CONTACTLESS SWITCHING ELEMENT FOR ELECTRIC CURRENT

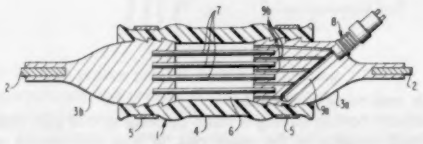
Helmut Buchner, Wendlingen, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Feb. 23, 1978, Ser. No. 880,610

Claims priority, application Fed. Rep. of Germany, Feb. 24, 1977, 2707956

Int. Cl.[2] H01H *37/72*

U.S. Cl. 338—34 **25 Claims**



1. A contactless switch for electric currents comprising:

(a) a switch body defining a hollow space;

(b) metal switch element means operable to be reversibly hydrogenated and dehydrogenated for rendering said switch element means electrically non-conductive and electrically conductive, respectively, said switch element means being positioned within said hollow space;

(c) hydrogen donor means in pressure-tight communication with said hollow space, said donor means containing a hydrogen donor metal that is operable to be dehydrogenated and hydrogenated in response to heating and cooling of said donor metal, respectively, and

(d) means for increasing and decreasing the temperature of said donor metal.

4,177,446

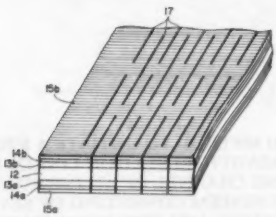
HEATING ELEMENTS COMPRISING CONDUCTIVE POLYMERS CAPABLE OF DIMENSIONAL CHANGE

Stephen H. Díaz, Los Altos, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 638,440, Dec. 8, 1975, abandoned. This application Mar. 9, 1977, Ser. No. 775,882

Int. Cl.[2] H01C *3/06*

U.S. Cl. 338—212 **18 Claims**



1. A heating element which comprises:

(A) a laminar member composed of a material which comprises an organic polymer and electrically conductive particles dispersed in the polymer in amount sufficient to render the member electrically conductive; and

(B) a pair of laminar flexible electrodes which (i) are connected to opposite faces of said laminar member; (ii) are substantially coplanar with said laminar member; and (iii) are adapted to be connected to an external source of power to cause current to pass through said laminar member;

said laminar member and laminar electrodes having a plurality of apertures through the thickness thereof, the apertures being in parallel rows and being of elongated closed cross-section and overlapping one another to permit at least one of the dimensions of the element in the plane thereof to be changed by a change in the shape of the apertures.

4,177,447

DEVICE FOR DETECTING ERRORS IN A DIGITAL TRANSMISSION SYSTEM

Jean-Yves Jaouen, Lannion, France, assignor to Compagnie Industrielle des Telecommunications Cit-Alcatel, Paris, France

Filed Mar. 1, 1978, Ser. No. 882,315

Claims priority, application France, Mar. 4, 1977, 77 06499

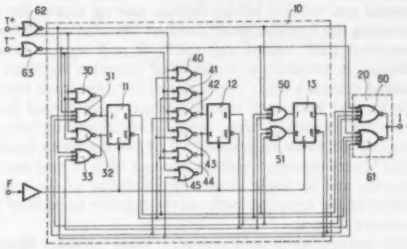
Int. Cl.[2] G06F *11/02*

U.S. Cl. 340—146.1 AB **15 Claims**

1. Apparatus for detecting errors in a digital transmission system of a type wherein the signal transmitted has a bounded digital running total which can assume any one of n distinct states, characterized by:

a synchronous up/down counter having an up-count input and a down-count input both of which are connected to receive said transmitted signal, said counter including K bi-stable multivibrators each of which has at least one input and first and second, complementary, outputs, each multivibrator having a logic arrangement associated with the at least one input thereto, said logic arrangement having a plurality of inputs connected to said up-count input, to said down-count input, and to selected ones of the first and second outputs of the remaining (K-1) multivibrators in the up/down counter; and

an end-decoder sensitive to any overflow of a lowest or highest count in said up/down counter, said decoder



including first and second logic circuits having inputs respectively connected to (a) said up-count input and the first outputs of said K bi-stable multivibrators, and (b) said down-count input and the second outputs of said K bi-stable multivibrators, and wherein:

K, the number of bistable multi-vibrators in said up/down counter, is an integer which satisfies the inequality:

$$2^{K-1} < n \leq 2^K.$$

4,177,448

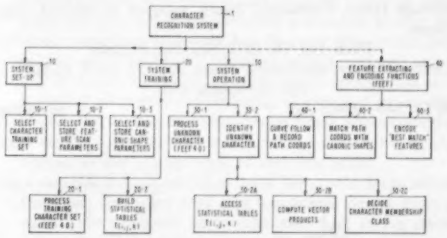
CHARACTER RECOGNITION SYSTEM AND METHOD MULTI-BIT CURVE VECTOR PROCESSING

Robert K. Brayton, Briarcliff Manor, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 26, 1978, Ser. No. 919,535

Int. Cl.[2] G06K *9/00, 9/16*

U.S. Cl. 340—146.3 AE **10 Claims**


CHARACTER RECOGNITION SYSTEM
SYSTEM SET-UP
SYSTEM TRAINING
SYSTEM OPERATION
FEATURE EXTRACTING AND ENCODING FUNCTIONS (FEEF)
SELECT CHARACTER TRAINING SET
SELECT AND STORE FEATURE SCAN PARAMETERS
SELECT AND STORE CANONIC SHAPE PARAMETERS
PROCESS UNKNOWN CHARACTER (FEEF 40)
IDENTIFY UNKNOWN CHARACTER
CURVE FOLLOW & RECORD PATH COORDS
MATCH PATH COORDS WITH CANONIC SHAPES
ENCODE "BEST MATCH" FEATURES
PROCESS TRAINING CHARACTER SET (FEEF 40)
BUILD STATISTICAL TABLES
ACCESS STATISTICAL TABLES
COMPUTE VECTOR PRODUCTS
DECIDE CHARACTER MEMBERSHIP CLASS

1. In an automatic character recognition system for identifying an unknown character wherein said unknown character is one of a class of a plurality of known characters, a scanning and training structure including:

means for storing a binary indicia a plurality of separate segments of character shapes, said separate segments being conformable to segments included within the shapes of said characters within said plurality of known characters, said binary encoded separate segments being referred to as canonic shapes and each being identified in said storage means by a binary encoded shape index number,

means for processing and manifesting a first known character from said character class in a digital matrix format of stored binary indicia,

means connected to said processing and manifesting means

for digitally scanning said stored first known character indicia using a first set of selected scan parameters, said selected scan parameters designating a specific start position, scan length, scan binary indicia transition and direction for said scanning function, said digital scanning function producing a first binary encoded path vector in the form of a multi-bit binary word including the starting coordinates of said scan and a plurality of further binary coordinates of said known character along the selected length of said scan,

means connected to said digital scanning and encoding means and to said binary indicia storing means for performing the complex inner product function of said binary encoded path vector and each of said stored canonic shapes to produce a plurality of complex numbers encoded in binary form, one for each complex inner product performed with each canonic shape, each of said binary encoded complex inner product numbers including a magnitude value representative of the similarity between said binary encoded path vector and each of said canonic shapes, and an angle value representative of the angular offset of the encoded path vector relative to each of said canonic shapes,

means connected to said complex inner product function means for determining the magnitude of each of said encoded complex inner product number and selecting the largest magnitude number and recording the shape index of the canonic shape which produced said largest magnitude complex inner product number,

means connected to said magnitude determining means for encoding at least said recorded shape index and said angle value within an N bit vector,

at least a first storage plane means including a separate storage column for each of different one of said characters in said class of a plurality of characters and 2^N storage rows for each different one of possible N bit vectors,

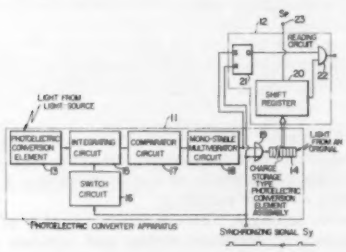
and means connected to said N bit vector encoding means and said first storage plane means of entering a first storage indicia into said at least first storage plane means at a discrete storage location corresponding to the column associated with said first known character and to the row associated with said encoded N bit vector associated with said recorded shape index and angle value.

4,177,449

PHOTOELECTRIC CONVERTER APPARATUS

Takatoshi Ikeda, Yokohama, Japan, assignor to Hitachi, Ltd., Japan

Filed Jan. 24, 1978, Ser. No. 871,808
Claims priority, application Japan, Jan. 27, 1977, 52-8075
Int. Cl.² G06K 9/00
U.S. Cl. 340—146.3 AG **16 Claims**



1. A photoelectric converter apparatus for reading information contained on an original information containing copy comprising:

a plurality of first photoelectric conversion elements disposed in an array for receiving light carrying image information to be read out of said original copy, said conversion elements each being of the charge storage type and adapted to store an amount of electric charge which is proportional to an intensity of said image information carrying light;

a second photoelectric conversion element for receiving light carrying luminance information of an external light source irradiating said original copy and for converting said luminance information carrying light into an electrical signal;

means for selectively transmitting a read-out signal to said first photoelectric conversion elements, said read-out signal transmitting means comprising a circuit for storing said electrical signal from said second photoelectric conversion element and means for producing said read-out signal when an output of said storing circuit reaches a predetermined reference level; and

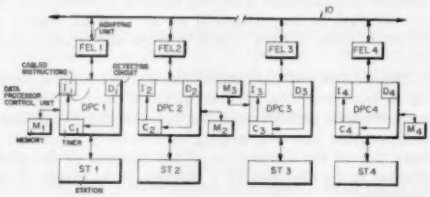
means for reading out electric charges stored in said first photoelectric conversion elements by an external first clock signal in response to said read-out signal.

4,177,450

PROCESS AND METHOD TO INITIATE A RECEIVING AND TRANSMITTING STATION LINKED BY A CONNECTING CHANNEL OF AN INFORMATION EXCHANGE SYSTEM CONSISTING OF SEVERAL TRANSMITTING AND RECEIVING STATIONS

Pierre Sarrand, Fresnes, France, assignor to Compagnie Internationale pour l'Informatique Cii - Honeywell Bull (Societe Anonyme), Paris, France

Filed Dec. 22, 1976, Ser. No. 753,494
Claims priority, application France, Dec. 31, 1975, 75 40365
Int. Cl.² H04Q 9/00
U.S. Cl. 340—147 LP **7 Claims**

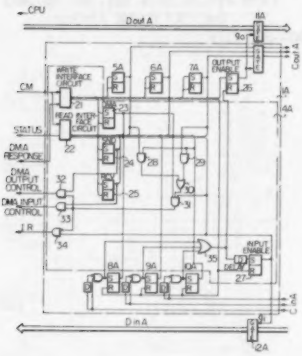


1. A method for initiating an exchange of information between a receiving and transmitting station of an information exchange system having several receiving and transmitting stations linked to one another by a connecting channel over which initiation information is transmitted toward one of the stations, each of the stations including a timing means, said method comprising the steps of detecting said initiation information transmitted by one of said stations during a first schedule to thereby couple the one station to said connecting channel and initiating a timing period of a given duration by setting each of the timing means to start counting from a common reference point; determining each of the timing means to have its unique time schedule toward which each timing means counts, if the one station is inoperative and fails to detect the initiation information, permitting another of the stations having a second time schedule greater than the first time schedule to detect the initiation information and to couple the other station to the connecting channel.

4,177,451
DATA COMMUNICATION SYSTEM

Taihei Yamaguchi, Yamato, Japan, assignor to Panafacom Limited, Japan

Continuation-in-part of Ser. No. 692,352, Jun. 3, 1976. This application May 16, 1978, Ser. No. 906,341
Claims priority, application Japan, Jun. 10, 1975, 50-69906
Int. Cl.[2] H04Q *9/00;* H04L *5/14;* H04J *3/06*
U.S. Cl. 340—147 R 7 Claims



1. A data communication system for transmitting and receiving data information comprising:

at least first communication control unit which sends control signals as control command signals when said one communication control unit is used as a transmitting side and which sends said control signals as various response signals when said first communication control unit is used as a receiving side, and;

second communication control unit which receives said control signals as said control command signals when said second communication control unit is used as a receiving side, and which receives said control signals as said various response signals when said second communication control unit is used as a transmitting side;

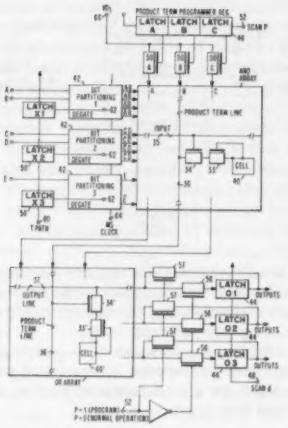
a plurality of lines for said data information, and, different plurality of lines for said control signals, which connect said first communication control unit and said second communication control unit in said system each respective communication control unit including respective first means for defining said control signals in accordance with a first set of meanings, including use as an inquiry command, and end-of-transmission command, and a receive command when said each respective communication control unit is used as the transmitting side, and each respective communication control unit including respective second means for defining said control signals in accordance with a second set of meanings, including use as a negative acknowledge response, a reverse interruption response, and an acknowledge response when said each respective communication control unit is used as the receiving side,

each respective communication control unit including respective logic circuit means, responsive to the use of said each respective communication control unit as a transmitting or receiving side and to said control signals, for determining which of said first and second sets of meanings to attach to said control signals.

4,177,452
ELECTRICALLY PROGRAMMABLE LOGIC ARRAY

Peruvemba S. Balasubramanian, Manassas, Va., and Stephen B. Greenspan, Boca Raton, Fla., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 5, 1978, Ser. No. 912,682
Int. Cl.[2] G11C *5/02, 11/40*
U.S. Cl. 340—166 R 7 Claims



1. A memory circuit, comprising:

a transistor flip flop circuit having a first active device with its current path connected between a first node and a zero state voltage and a second active device with its current path connected between a second node and said zero state voltage, said first node connected to the control electrode of said second active device and said second node connected to the control electrode of said first active device, with said first device having an initial nonconductive state and said second device having an initial conductive state;

a blocking transistor device having its current path connected to said second node and its control electrode connected to said first node;

an array transistor device having its current path connected between the current path of said blocking transistor and a word line and its control electrode connected to a bit line;

a circuit path from said word line through the current paths of said array device, said blocking device, and said second active device representing a first stored information state, a second information state being represented by an open circuit due to said blocking device being nonconductive;

said conduction state of said blocking device being controlled by the voltage state of said first node;

said voltage state at said first node being selectably altered from said first state with said first active device nonconductive to a second state with said first active device conductive, by the transmission of a write voltage signal from said word line through the current paths of said array device and blocking device to said control electrode of said first active device turning it on and thus switching the flip-flop and turning said blocking device off.

4,177,453
DIGITAL REMOTE CONTROL SYSTEM WITH IMPROVED NOISE IMMUNITY

Johnny Collins, Oak Park, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed Oct. 25, 1977, Ser. No. 845,191
Int. Cl.[2] H04Q *4/00*
U.S. Cl. 340—171 A 9 Claims

1. In a remote control receiver for selectively enabling a plurality of functions, each function corresponding to transmit-

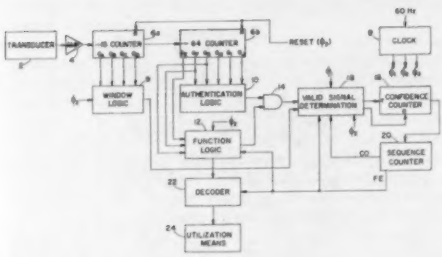
ted signals lying in a respective frequency band, the combination comprising:

means for defining a plurality of consecutive timing intervals;

means for repetitively deriving the frequency of a transmitted signal during each of said timing intervals;

means for identifying the condition wherein a derived frequency is within a restricted range of frequencies included within one of said frequency bands and centered about the frequency derived during the immediately preceding one of said timing intervals; and

means for enabling the function corresponding to said one frequency band in response to continued satisfaction of said condition for a predetermined number of successive ones of said timing intervals.



4,177,454

DIGITAL DISPLAY SYSTEM

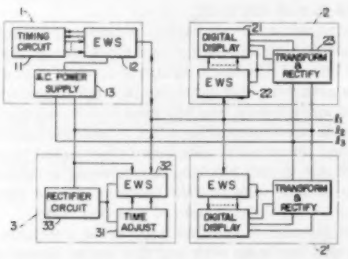
Yoshio Shinoda, Okazaki; Akira Kuno, Nagoya, and Toshinobu Kuroyama, Kasugai, all of Japan, assignors to Nippon Soken, Inc., Nishio and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

Filed Jun. 2, 1978, Ser. No. 911,895

Claims priority, application Japan, Jun. 8, 1977, 52-67670

Int. Cl.[2] G04C *13/02*; G08B *5/00*

U.S. Cl. 340—309.4 **2 Claims**



1. A digital display system comprising;

a single transmission control unit including an A.C. power supply for generating an A.C. voltage of a fixed frequency, and a time-division multiplex signal conversion circuit for extracting a pulse signal of said fixed frequency from said A.C. voltage to produce a reference position signal indicative of the beginning of a one cycle period based on said pulse signal to address a section in said one cycle period and producing a time-division multiplex signal which bears a command pulse at a specified address in accordance with a selected display signal;

a single signal line over which said time-division multiplex signal is transmitted;

a pair of power lines over which said A.C. voltage is transmitted; and

a plurality of display units each operable to read out a pulse signal of said fixed frequency from said A.C. voltage transmitted over said pair of power lines and read out said command pulse from said time-division multiplex signal received through said signal line based on said pulse signal to display in digital form the information relating to said display signal.

4,177,455

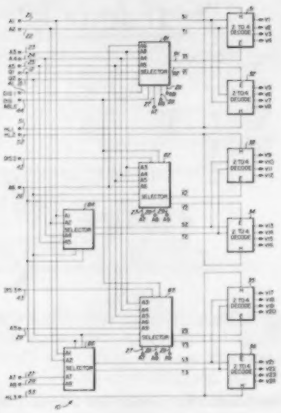
ELECTRICALLY CONFIGURABLE HIGH-LOW DECODER

Rolfe D. Armstrong, Escondido, and George B. Gillow, Bonita, both of Calif., assignors to NCR Corporation, Dayton, Ohio

Filed Jan. 9, 1978, Ser. No. 867,853

Int. Cl.[2] H03K *13/243*

U.S. Cl. 340—347 DD **16 Claims**



1. A selectively configurable decoder having at least a mode selection input, a plurality of address inputs, and a plurality of outputs, said selectively configurable decoder comprising in combination:

(a) a plurality of decoding means each having a plurality of decode inputs for decoding selectable combinations of signals applied to said decode inputs, each of said decoding means having an enable input and a plurality of outputs coupled to respective ones of said outputs of said selectively configurable decoder;

(b) first means responsive to said address inputs and said mode selection input for producing said selectable combinations of signals; and

(c) second means responsive to said mode selection input and said address inputs and coupled to said enable inputs of said plurality of decoding means for enabling a plurality of combinations of said plurality of decoding means in response to a plurality of combinations of binary logic levels applied to said mode selection input.

4,177,456

DECODER FOR VARIABLE-LENGTH CODES

Takahiko Fukinuki, Kokubunji, and Hiroshi Yoshigi, Hachioji, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Feb. 3, 1978, Ser. No. 874,938

Claims priority, application Japan, Feb. 10, 1977, 52/13925; Feb. 28, 1977, 52/20210; Feb. 28, 1977, 52/20211

Int. Cl.[2] H03K *13/243*

U.S. Cl. 340—347 DD **4 Claims**

1. A decoder for decoding variable-length codes comprising:

an input to which a variable length code is to be applied;

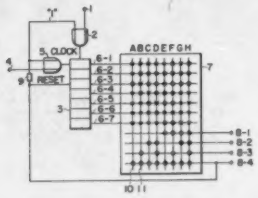
a shift register, coupled to said input, for receiving a variable length code applied thereto and storing said variable-length code;

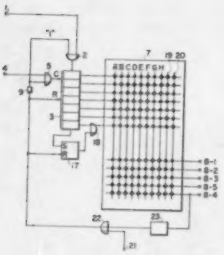
first means, coupled to the stages of said shift register, for

converting the contents of said shift register into a fixed-length code as an output signal;

second means, coupled to said first means, for detecting the completion of the code conversion operation carried out by said first means;

third means, coupled to said second means, for causing said





shift register to receive and store a prescribed code in response to said second means detecting said completion of the code conversion operation; and

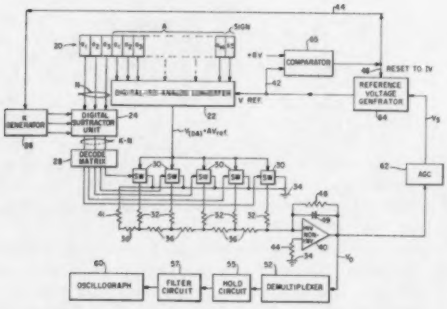
fourth means, coupled to the last stage of said shift register, for storing a signal representative of overflow from said last stage of said shift register and applying said signal to said first means.

4,177,457

FLOATING POINT PLAYBACK SYSTEM

Donald L. Howlett, Houston, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Dec. 12, 1977, Ser. No. 859,491
Int. Cl.[2] H03K *13/02*
U.S. Cl. 340—347 DA **10 Claims**



1. In a system wherein a wide dynamic amplitude range analog signal is digitized in floating point word form, said word being represented in digital signal form by the general algebraic form $Q=\pm AB^{-N}$ wherein Q represents the amplitude of the analog signal, A represents the mantissa, B indicates the radix of the number system used, N is the exponent, and wherein said word is represented by a first plurality of binary bits representing ±A and a second plurality of binary bits representing N, a system for recreating an analog signal from the floating point words comprising: first means for converting said bits representing A to an interim analog signal; second means for converting said bits representing N to a plurality of control signals; resistor network means for providing a signal which is a reduction of a signal applied to the resistor network means, said resistor network means including a first plurality of N number of resistor, having a first resistor and an Nth resistor, and all resistors in the first plurality of resistors have the same resistance value; a second plurality of N number of serially connected resistors having a first resistor and an Nth resistor, all resistors of the second plurality of resistors have the same resistance value, and connected so that each connection of two resistors of the second plurality of resistors is connected to one end of a corresponding resistor in the first plurality of resistors, and a first resistor connecting the Nth resistor of the second plurality of resistors to ground, where the first resistor has a resistance value that is one-seventh of the value of the resistance value of a resistor in the second plurality of resistors and a resistance value that is seven-eighths of the resistance value of a resistor in the first plurality of resistors; a plurality of switching means, each switching means being connected to the first and second converting means, to ground and to the unconnected end of a corresponding resistor of the first plurality of resistors for applying the interim analog signal to the corresponding resistor of the first plurality of resistors when a corresponding control signal is at one logic level and for connecting the corresponding resistor of the first plurality of resistor network means to ground when the corresponding control signal is at another logic level; and amplifier means connected to the unconnected end of the first resistor of the second plurality of resistors for amplifying the signal provided by the resistor network means to provide an amplified signal corresponding to the wide dynamic amplitude range analog signal.

4,177,458

DISPLAY PANEL AND DISPLAY ELEMENTS THEREFOR

Yoshimasa Wakatake, Tokyo, Japan, assignor to Nihon Advanced Products Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 23, 1978, Ser. No. 871,700
Claims priority, application Japan, Jan. 24, 1977, 52-6523
Int. Cl.[2] G06K *15/18*
U.S. Cl. 340—373 **7 Claims**

1. A display panel comprising:

a display surface structure;

a display switching unit; and

a drive unit;

in which, letting N vertical lines of arrangement spaced a predetermined distance from adjacent ones of them in a horizontal direction be represented by $a_1, a_2, \ldots a_N$, respectively, the display surface structure has M display elements $D_{i1}, D_{i2}, \ldots D_{iM}$ disposed on the vertical line a_i (i+1, 2, . . . N) at predetermined intervals in a vertical direction;

in which the display element D_{ij} (j+1, 2, . . . M) is formed with a block member having a shaft receiving hole extend-

ing in the horizontal direction, an outer periphery forming a plurality of display surfaces of different colors to form a plurality of corners around the shaft receiving hole, and a magnetic piece disposed in each of the corners except one of them, the display element D_{ij} being supported by a shaft loosely inserted into the shaft receiving hole in a manner to be rotatable about the shaft, the shaft receiving hole having such an inner peripheral configuration as to permit a selected one of the display surfaces to lie in a vertical plane in the state of the display element D_{ij} being supported by the shaft;

in which the display switching unit has a display control head E_i disposed to be movable along the vertical line a_i in the vertical direction, the display control head E_i having electromagnets less than the corners of the block member by one; and

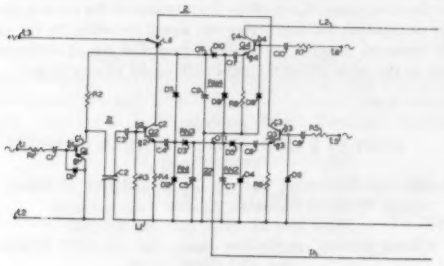
in which the drive unit has means for simultaneously moving down the display control heads E_1 to E_N and means for driving the electromagnets of the display control head E_i in synchronism with the movement of the display control head E_i.

4,177,459

FAIL-SAFE ACKNOWLEDGING CIRCUIT

John O. G. Darrow, Murrysville, Pa., assignor to Westinghouse Air Brake Company, Swissvale, Pa.

Filed May 24, 1977, Ser. No. 800,133
Int. Cl.[2] G08B *21/00*
U.S. Cl. 340—519 **10 Claims**



1. A fail-safe electronic circuit arrangement which requires an acknowledgment after the reception of a more restrictive input signal in order to reestablish an output signal comprising, a plurality of latching means connectable to a separate one of a plurality of input signals having a predetermined order of more restrictive significance, one of a plurality of gating means cooperatively associated with a separate one of said plurality of latching means, and a multiple input gating means coupled to said plurality of latching and gating means for producing an output signal and conditioned upon the reception of a more restrictive input signal for causing the removal of the output signal.

4,177,460

TWO-WAY ALARM SAFETY APPARATUS

Walter W. Hoinski, Norristown, and John J. Simkanich, Yardley, both of Pa., assignors to Power Systems Development Corp., Wilmington, Del.

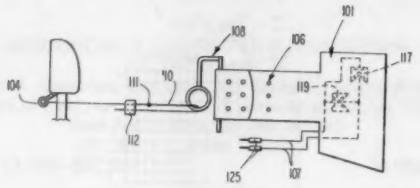
Filed Sep. 30, 1977, Ser. No. 838,136
Int. Cl.[2] G08B *21/00*; B60R *27/00*
U.S. Cl. 340—576 **10 Claims**

1. An alarm apparatus, capable of being worn by operators of motor vehicles and the like, to signal an undesirable position of one part of the body with respect to another or with respect to a fixed object, comprising:

means for providing an electrically produced signal;

an electrical power source capable of powering said electric signal means;

means responsive to an undesirable position of the body for electrically connecting said electric signal means to said electrical power source, said electrical connection means including two electric switches each being capable of individually electrically connecting said electric signal



means to said electrical power source, said switches being positioned to have two distinct planes of operation; and

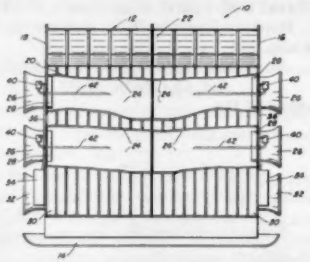
means for securing said electrical connection means to said body.

4,177,461

SMOKE ALARM DEVICE FOR A GRAIN DRYER

David A. Brown; Jan L. Norman, and Donald W. Whitson, all of Scott City, Kans., assignors to All Phase Electronics, Inc., Scott City, Kans.

Continuation-in-part of Ser. No. 684,718, May 10, 1976, abandoned. This application Jan. 23, 1978, Ser. No. 871,372
Int. Cl.[2] G08B *17/10*
U.S. Cl. 340—628 **9 Claims**



1. A grain dryer alarm device attached to a housing of a grain dryer, the alarm device comprising:

a smoke detector housing disposed outside the dryer housing;

a smoke detector mounted inside said detector housing;

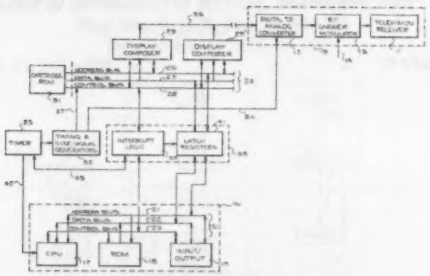
an elongated conduit having one end communicably connected to said smoke detector housing, said conduit attached to and extending through the dryer housing, the other end of said conduit disposed inside a hot air chamber of the dryer, said conduit receiving smoke therein and conducting the smoke to said smoke detector housing and said smoke detector when smoke occurs in the hot air chamber;

dryer signal means attached to the dryer and electrically connected to said smoke detector for signaling when smoke is detected in the dryer.

4,177,462
COMPUTER CONTROL OF TELEVISION RECEIVER DISPLAY

David H. Chung, Palo Alto, Calif., assignor to Umtech, Inc., Palo Alto, Calif.

Filed Dec. 30, 1976, Ser. No. 755,749
Int. Cl.[2] G06F 3/14
U.S. Cl. 340—703 22 Claims



1. A method of producing sequential frame displays of object images and background on a display surface area which is scanned by a scanning system to produce each of said frame displays, comprising the steps of:

storing at predetermined locations sets of information respectively defining a plurality of spatial display segments which individually at least partially define an object image associated therewith it may be desired be displayed at some location on said display area during one or more of said sequential frame displays;

tracking the scan by said scanning system which produces each of said frame displays;

responding to said step of tracking indicating that said scanning system is approaching a desired spatial location for a selected spatial segment in one of said frame displays by directing delivery to said scanning system at such time of control signals conforming to the stored information set defining said selected spatial display segment;

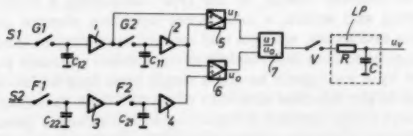
calculating for each of said frame displays the time-distance between spatial display segments which are to be sequentially displayed thereon; and

providing to said scanning system background control signals directing said scanning system to produce said background display between spatial display segments for said calculated time-distance.

4,177,463
METHOD AND DEVICE FOR MEASURING THE VELOCITY OF AN OBJECT RELATIVE TO A REFERENCE

Ingvar Andermo, Täby, Sweden, assignor to Stiftelsen Institutet for Mikrovågsteknik vid Tekniska Hogskolan I Stockholm, Stockholm, Sweden

Continuation of Ser. No. 688,334, May 20, 1976, abandoned, which is a continuation of Ser. No. 473,943, May 28, 1974, abandoned. This application Dec. 20, 1977, Ser. No. 862,609
Claims priority, application Sweden, Jun. 1, 1973, 7307801
Int. Cl.[2] G01S 9/44
U.S. Cl. 343—8 19 Claims



1. A method for measuring the velocity of an object relative to a reference surface by means of spaced receivers on the object, said receivers being positioned one after the other in the direction of the velocity component to be measured, comprising:

transmitting a signal to the reference surface which reflects the transmitted signal, the reflected signal being a spatial waveform function originating from the reflecting surface and which is defined by the nature of the surface of the reference;

receiving the reflected signals by said receivers and developing output signals in each receiver, the values of said output signals being a function of the position of the detecting area of the receiver relative to the reference surface;

sequentially sampling said receiver output signals at different scanning occasions;

storing the sampled values of the receiver output signal from a number of detecting areas at various positions relative to the object at a first scanning occasion, said stored sampled output signal values representing a sampled virtual image of the spatial waveform function;

interpolating the stored signal values by interpolation between said sample values of said sampled virtual image representing signal values at the first scanning occasion, to thereby develop an approximation of the spacial waveform function;

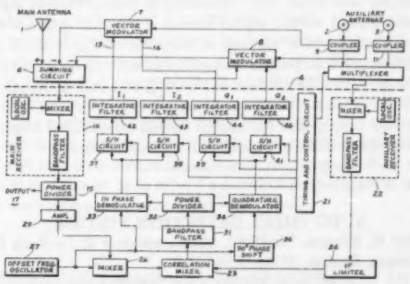
comparing values of the developed approximation of the spatial waveform function with corresponding values of a developed approximation of the spatial waveform function obtained at a later scanning occasion and generating a difference output which is the result of said comparing; and

determining the displacement of the developed spatial waveform function relative to the object between said first and later scanning occasions, and generating a velocity signal that is a function of the quotient between said difference output and said approximation of the spatial waveform function and of the time elapsing between said first scanning occasion and said later scanning occasion, said velocity signal representing the velocity of the object relative to the reference surface.

4,177,464
MULTIPLEXING OF MULTIPLE LOOP SIDELOBE CANCELLERS

Raymond J. Masak, East Northport, N.Y., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 13, 1978, Ser. No. 960,207
Int. Cl.[2] G01S 3/06
U.S. Cl. 343—100 LE 3 Claims



1. An improved sidelobe canceller in which cancellation of the undesired signals is performed at RF and the cancellation weights are determined from samples of correlated and demodulated signals, wherein the improvement comprises: a multiplexer communicating with each auxiliary antenna and capable of transmitting any one of the auxiliary antenna signals into a channel of signal processing upon command, and a timing and

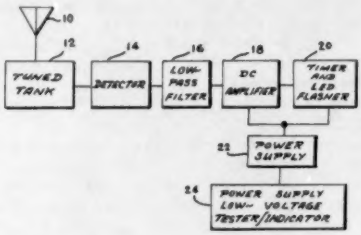
control circuit connected to said multiplexer and a set of sample and hold circuits in the signal processing channel, where said timing and control circuit coordinates the multiplexer transmission of each antenna signal with a timed sampling by said sample and hold circuits for the corresponding auxiliary antenna.

4,177,465

NEAR-RANGE PERSONNEL BEACON LOCATOR APPARATUS

Donald O. Lundvall, I, Papillion; John P. Engels, and Robert R. Yesconis, both of Omaha, all of Nebr., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Oct. 6, 1978, Ser. No. 949,189
Int. Cl.[2] G01S *11/00*
U.S. Cl. 343—112 D **7 Claims**



1. A personnel beacon locator apparatus comprising in combination:

an antenna and tuned tank circuit to receive an RF signal, said RF signal being radiated by an accidently activated survival beacon,

a detector unit connected to said tuned tank circuit to detect said RF signal, said detector unit providing a detected RF output signal,

a low pass filter unit connected to said detector unit to filter said detected RF output signal, said low pass filter unit providing a filtered output signal,

an operational amplifier connected to said low pass filter unit to receive said filtered output signal, said operational amplifier having a variable gain, said operational amplifier amplifying said filtered output signal to provide a DC level, said DC level being proportional to the distance to said activated survival beacon,

a timer unit connected to said operational amplifier to receive said DC level, said timer unit having a variable duty cycle, said timer unit providing a pulsed output signal, said pulsed output signal having a variable pulse width, said pulse width varying in response to the level of said DC level, said pulsed output signal driving an LED indicator, said LED indicator blinking at a rate proportional to the diatance to said activated survival beacon, and,

a power supply unit connected to said operational amplifier and timer units to supply DC voltages thereto.

4,177,466

AUTO THEFT DETECTION SYSTEM

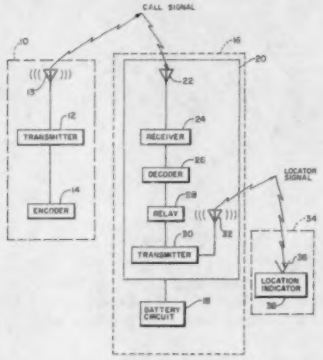
William R. Reagan, Medfield, Mass., assignor to Lo-Jack Corporation, Boston, Mass.

Filed Nov. 16, 1977, Ser. No. 851,835
Int. Cl.[2] G01S *11/00*
U.S. Cl. 343—112 TC **21 Claims**

2. A system for indicating the proximity of a stolen vehicle comprising:

at least one first transmitter means adapted to broadcast a call signal modulated with any selected one of a plurality of vehicle identification codes each assigned to a different one of a multitude of vehicles including said stolen vehicle;

a transceiver affixed to said stolen vehicle, said transceiver including first receiver means for receiving said call signal, second transmitter means adapted to broadcast a continuous locator signal, and circuit means coupled between said first receiver means and said second transmitter means for activating said second transmitter means only upon reception by said first receiver means of said call



signal modulated with said vehicle identification code assigned to said stolen vehicle;

a plurality of second receiver means each adapted to receive and respond to said locator signal, said second receiver means being remote from said first transmitter means and separate from said stolen vehicle; and

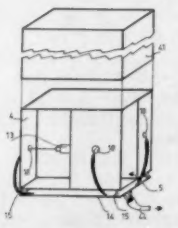
means responsive to said second receiver means for providing an indication of at least the bearing or distance of said stolen vehicle relative to said second receiver.

4,177,467

WAVEGUIDE RECEIVING ANTENNA

Jean J. Vigneron, Saint-Germain les Arpajon, France, assignor to Regent Marine & Instrumentation, Inc., Buffalo, N.Y.

Filed Mar. 20, 1978, Ser. No. 887,925
Claims priority, application France, Mar. 24, 1977, 77 08700
Int. Cl.[2] G01S *3/28*
U.S. Cl. 343—119 **19 Claims**



16. An antenna for short-range reception of a signal emitted by an emission source, of the type comprising a sector for locating said source, a microwave detecting element placed within said sector, wherein said antenna comprises at least two sectors which are independent of each other and each constituted by a waveguide having a single open face which is oriented in the intended direction of surveillance, said detecting element being disposed at right angles to and at the geometrical center of the supporting wall of the waveguide associated with said detecting element, the frequencies detected by said antenna being within the range of 10^9 Hz to 30×10^9 Hz, the signal delivered by the detecting element being processed

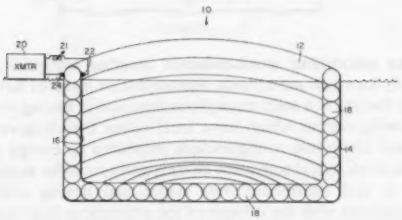
directly by signal processing means in order to permit a variation in range of said antenna.

4,177,468

INFLATABLE CAVITY-BACKED ANNULAR SLOT TRANSMITTING ANTENNA

Elwin W. Seeley, and Verne E. Hildebrand, both of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 5, 1978, Ser. No. 939,735
Int. Cl.[2] H01Q *1/34, 13/10*
U.S. Cl. 343—710 **10 Claims**



1. A floatable radio antenna capable of floating in a liquid with the radiating slot projecting above the surface, comprising:

a cup shaped body having an inner conducting surface and an outer conducting surface,

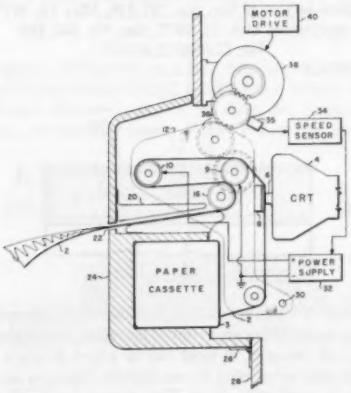
said inner conducting surface being separated from said outer surface by buoyant insulating means with the lip of the cup shaped body forming the radiating slot.

4,177,469

RECORDER WITH ELECTRICALLY CONDUCTIVE PAPER

Dean M. Peterson, Littleton, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 8, 1977, Ser. No. 858,785
Int. Cl.[2] G01D *9/42, 15/24*
U.S. Cl. 346—110 R **9 Claims**



1. A recorder for an electrically conductive recording medium comprising

a first electrically conductive roller arranged to support the recording medium at a first roller contact area,

a second electrically conductive roller arranged to support the recording medium, said first roller being spaced from said second roller,

a third roller arranged to urge the recording medium after passage of said medium over said second roller against said first roller on the side of said first roller opposite to said first roller contact area,

a power supply means for providing an output potential across a pair of output terminals,

first circuit means connecting one of said output terminals to said first roller,

second circuit means connecting the other one of said output terminals to said second roller, said power supply means producing a current flow to the recording medium to produce a developing of a recording thereon,

means for recording on the recording medium prior to its passage over said first roller on said first roller contact area, and

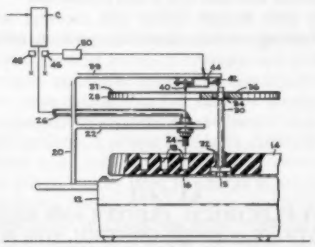
recording medium drive means arranged to drive the recording medium past said means for recording and over said first, second and third rollers.

4,177,470

DATA RECORDING APPARATUS

Emmett L. Durrum, Menlo Park, Calif., assignor to Eldex Laboratories, Incorporated, Menlo Park, Calif.

Division of Ser. No. 705,471, Jul. 15, 1976, Pat. No. 4,064,512. This application Dec. 13, 1977, Ser. No. 860,232
Int. Cl.[2] G01D *15/16, 15/24*
U.S. Cl. 346—139 R **1 Claim**



1. Improved data recording apparatus for recording data the magnitude of which varies with time comprising a circular carrier having a central axis, means for supporting said carrier for rotation on said axis, inscribing means and carriage means for mounting said inscribing means above said carrier, means for moving said carriage means radially of said central axis in response to rotation of said carrier so as to cause said inscribing means to traverse a spiral path relative said carrier, drive means carried on said carriage means for rotatively driving said carrier, said drive means including a wheel driven at a preselected speed about a generally radially extending axis, said wheel having a periphery in driving contact with said carrier at a point in alignment with said inscribing means so that in response to rotation of said wheel and activation of said moving means said inscribing means travels on a spiral path on said carrier which spiral path has a linear time base, and means for activating said inscribing means to inscribe data indicia adjacent said path that is indicative of the magnitude of variations in the data so as to afford a quantitative indication of said data with reference to the linear time base.

4,177,471

CARRIAGE AND RACEWAY MECHANISM FOR AN INK JET PRINTER

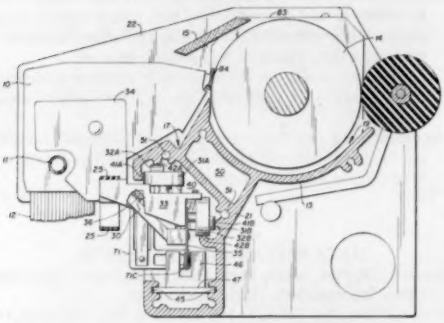
Charles S. Mitchell, Palo Alto, Calif., assignor to Silonics, Inc., Sunnyvale, Calif.

Filed Nov. 4, 1977, Ser. No. 848,615
Int. Cl.[2] G01D *15/18;* **B41J** *3/04, 19/00*
U.S. Cl. 346—140 R **9 Claims**

1. In a printer mechanism having a main frame, side plates at

either end of said main frame, a platen rotatably mounted to said side plates, a carriage assembly, a print head mounted to said assembly, the main frame being a single piece of uniform cross-section along its length between said side plates, comprising:

a raceway, engaging said carriage assembly whereby said assembly moves along said raceway,



a stiffening section in close proximity with said raceway,

a paper guide above said stiffening section,

guide points near said raceway whereby said raceway may be machined and said side plates positioned,

receptacle slots located below said raceway whereby a board bearing carriage assembly position indicators in placed.

4,177,472

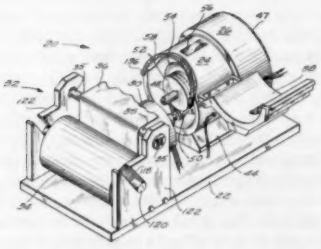
ROTARY ELECTRICAL PRINTER AND METHOD AUTOMATIC BLACKNESS CONTROL FOR ROTARY ELECTRICAL PRINTER

Olin B. King, Huntsville, Ala., assignor to SCI Systems, Inc., Huntsville, Ala.

Division of Ser. No. 611,785, Sep. 9, 1975, Pat. No. 4,100,551. This application Mar. 22, 1978, Ser. No. 888,967

Int. Cl.² G01D *15/08*; G03G *21/00*

U.S. Cl. 346—162 **4 Claims**



1. In a rotary electrical discharge printer including a rotor, at least one stylus on said rotor, means for rotating said rotor and moving said stylus relative to an electrical discharge-sensitive record member, discharge means for applying an electrical voltage to said stylus and creating an electrical discharge between said stylus and said record member at predetermined positions so as to form images on said record member, means for detecting the speed of movement of said rotor relative to said record member, and means for varying the voltage applied to said stylus approximately in direct proportion to said speed.

4,177,473

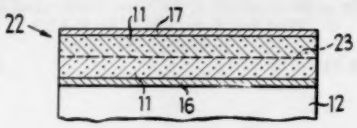
AMORPHOUS SEMICONDUCTOR MEMBER AND METHOD OF MAKING THE SAME

Stanford R. Ovshinsky, Bloomfield Hills, Mich., assignor to Energy Conversion Devices, Inc., Troy, Mich.

Filed May 18, 1977, Ser. No. 797,929

Int. Cl.² H01L *45/00*

U.S. Cl. 357—2 **96 Claims**



1. An amorphous semiconductor member comprising a primarily lone-pair amorphous semiconductor material having orbitals formed in a solid amorphous host matrix having structural configurations which have local rather than long-range order and electronic configurations providing an energy gap and a large electrical activation energy, and a modifier material added to said amorphous host matrix and having orbitals which interact with the orbitals of the amorphous host matrix and form electronic states in the energy gap which modify substantially the electronic configurations of the amorphous host matrix for reducing substantially the electrical activation energy thereof and, hence, increasing substantially the electrical conductivity of the semiconductor member at room temperature and above, the amount of addition of the modifier material controlling the range of electrical conductivity.

4,177,474

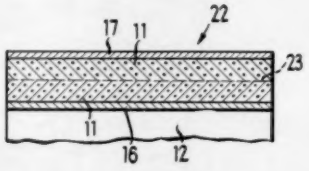
HIGH TEMPERATURE AMORPHOUS SEMICONDUCTOR MEMBER AND METHOD OF MAKING THE SAME

Stanford R. Ovshinsky, Bloomfield Hills, Mich., assignor to Energy Conversion Devices, Inc., Troy, Mich.

Continuation-in-part of Ser. No. 797,929, May 18, 1977. This application Oct. 12, 1977, Ser. No. 841,369

Int. Cl.² H01L *45/00*

U.S. Cl. 357—2 **73 Claims**

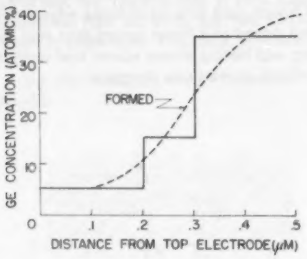


1. An amorphous semiconductor member comprising an amorphous semiconductor material including a composition of a plurality of elements, at least one of which is a low atomic weight element comprising boron, carbon, nitrogen or oxygen, formed in a solid amorphous host matrix having structural configurations which have local rather than long range order and electronic configurations providing an energy gap and an electrical activation energy, and a modifier material added to said amorphous host matrix and having orbitals which interact with the amorphous host matrix and form electronic states in the energy gap which modify substantially the electronic configurations of the amorphous host matrix at room temperature and above.

4,177,475
HIGH TEMPERATURE AMORPHOUS MEMORY DEVICE FOR AN ELECTRICALLY ALTERABLE READ-ONLY MEMORY

Scott H. Holmberg, Escondido, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed Oct. 31, 1977, Ser. No. 847,068
Int. Cl.[2] H01L *45/00*
U.S. Cl. 357—2 10 Claims

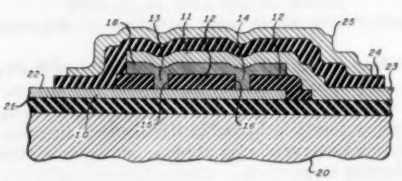


1. An electrically alterable memory device comprising:
a positive electrode;
a negative electrode; and
a structure of memory material mounted in between said electrodes, which structure is constructed of first, second and third regions, said first region being adjacent to said positive electrode, said second region being between said first and third regions, said third region being adjacent said negative electrode and completely separating said second region from said negative electrode;
said second region being formed of a tellurium based chacogenide which has higher electrical resistance in its amorphous state and lower electrical resistance in its crystalline state and can be switched from one state to another upon application to said electrodes of an electrical signal of appropriate value;
said first region being formed of a material having a higher percentage of tellurium than said second region;
said third region being formed of a material having between 25 and 45 atomic percent of germanium, the remaining material being substantially tellurium.

4,177,476
MULTIPLE WEAK-LINK SQUID WITH NON-SUPERCONDUCTIVE MATERIAL WEAK-LINKS

Harry Kroger, Sudbury, and Don W. Jillie, Jr., Arlington, both of Mass., assignors to Sperry Rand Corporation, New York, N.Y.

Filed May 5, 1978, Ser. No. 903,309
Int. Cl.[2] H01L *39/22*
U.S. Cl. 357—5 28 Claims

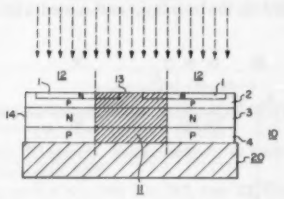


1. A SQUID comprising
first and second layers of superconductive material superposed with respect to each other,
insulator layer means to disposed between said superconductive layers, said insulator layer means having at least two holes therethrough and
non-superconductive material within said holes forming weak superconducting links between said first and second superconductive layers by the proximity effect induced by said first and second superconductive layers,
whereby a magnetic field applied to said SQUID causes control of the supercurrent flowing between said first and second superconductive layers through said weak links.

4,177,477
SEMICONDUCTOR SWITCHING DEVICE

Shigeru Hokuyo, and Hiroshi Gamo, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Continuation of Ser. No. 557,156, Mar. 10, 1975, abandoned.
This application May 3, 1977, Ser. No. 793,242
Claims priority, application Japan, Mar. 11, 1974, 49 28739
Int. Cl.[2] H01L *29/74, 29/167*
U.S. Cl. 357—38 7 Claims



1. A semiconductor switching device comprising: a wafer of semiconductor material having two major opposed generally parallel surfaces, said wafer comprising four layers of opposite conductivity type disposed in PN junction forming relationships, an n-type emitter layer disposed adjacent to an upper one of the major surfaces, a p-type base layer disposed below the n-type emitter layer and having a region extending upwards through the n-type emitter layer to emerge at the upper major surface and share a portion of the upper major surface with the n-type emitter layer, an n-type base layer below the p-type base layer, a p-type emitter layer below the n-type base layer and extending downwards to the lower major surface, wherein a gate region of the device is defined at the upper major surface at a portion of the surface where the p-type base layer emerges, a metal doped region sufficiently doped with heavy metal atoms to define within said metal doped region stable charge recombination centers, wherein said metal doped region extends throughout an initial conduction region of the device which exhibits an operating temperature in use sufficiently elevated to anneal the semiconductor material comprising said wafer and which consists of the gate region and a portion of the n-type emitter layer immediately adjacent the gate region and the portions of said wafer laying thereunder and extending down to the lower major surface of said wafer, the remainder of said wafer being free of said heavy metal atoms, at least the portion of said wafer free of heavy metal atoms having radiation induced charge recombination centers throughout, and the concentration of radiation induced charge recombination centers in said initial conduction region being substantially less than outside of said initial conduction region.

4,177,478
AMPLIFYING GATE THYRISTOR WITH GATE TURN-OFF (G.T.O.)

Albert Sénés, L'Hay les Roses, France, assignor to Alsthom-Atlantique, Paris, France

Filed Jan. 4, 1978, Ser. No. 866,897
Claims priority, application France, Jan. 10, 1977, 77 00471
Int. Cl.[2] H01L *29/74*
U.S. Cl. 357—38 3 Claims

1. An amplifying gate thyristor with gate turn off, comprising a semiconductor monocrystalline wafer with two surfaces which are an anode surface and a cathode surface and which

are metallized, the surface of this wafer comprising five zones which succeed each other in the following order:

a gate zone;

a trigger amplification zone;

a turn off zone;

a trigger transmission zone;

and a main zone;

the wafer comprising in these five zones a stack of semiconductor layers and superimposed metallization in the following order starting from the anode surface;

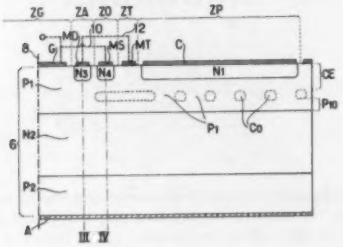
an anode constituted by metallization;

a P type semiconductor injection layer;

an N type semiconductor blocking layer;

and a P type semiconductor base layer reaching in some places the cathode surface;

the wafer comprising; in the gate zone, a gate constituted by metallization deposited on the base layer; in the trigger amplification zone a trigger emitter separated from the gate and constituted by an N type semiconductor layer disposed on the base layer and coated with trigger emitter



metallization in the turn off zone, a shunt diode constituted by an N type semiconductor layer disposed on the base layer, this N layer being separated from the trigger emitter and coated with covering shunt diode metallization connected to the gate, in the trigger transmission zone, transmission metallization deposited on the base layer, separated from the shunt diode metallization and connected to the trigger emitter metallization; in the main zone, a main emitter constituted by an N type layer disposed on the base layer and coated with a cathode constituted by metallization separated from the transmission metallization; and a conduction layer situated in the thickness of the base layer and constituted by a P+ type semiconductor layer, in which the doping concentration is higher than that of the base layer, this conduction layer extending over the turn off zone, the trigger transmission zone and the main zone, forming in the main zone a buried grid whose gaps are occupied by the material of the base layer so as to allow the negative carriers to pass through these gaps from the main emitter to the blocking layer.

4,177,479

ELECTRICAL CIRCUIT WITH A HIGH-FREQUENCY THYRISTOR FIRED BY BLOCKING LEAKAGE CURRENT

Patrick DeBruyne, Siggenthal, and Roland Sittig, Umiken, both of Switzerland, assignors to BBC Brown Boveri & Company, Limited, Baden, Switzerland

Continuation of Ser. No. 713,484, Aug. 11, 1976, abandoned. This application Apr. 6, 1978, Ser. No. 894,033

Claims priority, application Switzerland, Sep. 9, 1975, 11695/75

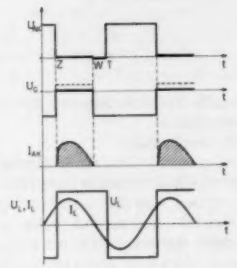
Int. Cl.[2] **H01L** *29/74*

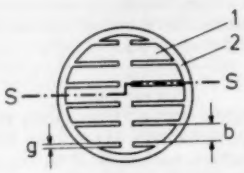
U.S. Cl. 357—38 **4 Claims**

1. A method of operating a thyristor circuit which includes a load and at least one thyristor in series connection with said load, using biasing means which subjects said thyristor to an alternating current having a frequency greater than 10 kHz and a voltage greater than 500 V, and a gate circuit for applying predetermined potentials to said thyristor to selectively fire said thyristor, comprising the steps of:

providing said at least one thyristor with an emitter zone and a gate in the form of an interdigitated emitter-gate structure, a control zone in contact with said gate, a base zone which is doped to a lesser extent than the control zone and an anode zone, said control zone being free from any short circuits to an electrode in contact with said emitter zone bridging the PN-junction between said control and said emitter zones, and said base zone consisting of first and second layers, said first layer being adjacent said control zone and doped to a lesser extent than said second layer;

connecting said biasing means across said emitter and anode zones of said at least one thyristor;





maintaining the electrical potential of said gate during the forward blocking state of the thyristor such that the PN-junction between the control zone and the contiguous emitter zone is polarized in the blocking direction, said biasing means generating a leakage current in said forward blocking state;

firing said thyristor during a positive load current period by means of said leakage current by setting the potential of said gate to a value between and including zero and the opposite of the potential of the gate during the forward blocking state; and

setting the potential of said gate again to the value of the forward blocking state after said alternating current turns to its negative load current period.

4,177,480
INTEGRATED CIRCUIT ARRANGEMENT WITH MEANS FOR AVOIDING UNDESIRABLE CAPACITIVE COUPLING BETWEEN LEADS

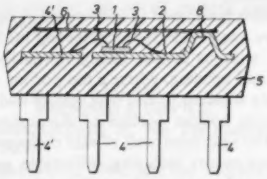
Kurt Hintzmann, Leingarten; Reinhold Kaiser, Heilbronn-Sontheim; Wolfgang Link; Willy Minner, both of Schwaigern; Dieter Mutz, Heilbronn-Frankenbach; Manfred Salomon, Leingarten, and Arnim Wingert, Heilbronn, all of Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt, Fed. Rep. of Germany

Continuation of Ser. No. 728,878, Oct. 1, 1976, abandoned. This application Apr. 26, 1978, Ser. No. 900,647

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1975, 2543968

Int. Cl.[2] H01L *49/00, 25/04, 29/40*

U.S. Cl. 357—84 **22 Claims**



1. In an integrated circuit arrangement, particularly an amplifier, including a semiconductor body carrying an integrated circuit, said semiconductor body being embedded in a casing of insulating material together with flat supply lines which do not extend over a surface of said semiconductor body and which are connected to the contacts of said semiconductor body; the improvement wherein: an electrically conductive areal element, which extends only in a plane which is substantially parallel to the plane in which the parts of the flat supply lines embedded in the insulating material and associated with the connecting points of the semiconductor body are located, is present in said insulating material or on the surface of said insulating material casing only on the side of the surface of said semiconductor body on which the devices of the integrated circuit are located in the semiconductor body; the area of said electrically conductive areal element projected on to the plane of said flat supply lines extends from one supply line to another between which an undesirable capacitance coupling occurs which makes decoupling necessary; and means are provided for connecting said electrically conductive areal element to a reference potential.

4,177,481
MAGNETIC RECORDING AND/OR REPRODUCING APPARATUS WITH CHROMINANCE CROSSTALK ELIMINATION

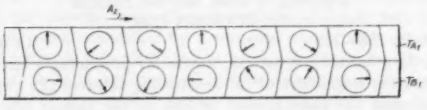
Kazuo Yamagiwa, and Masahiro Tada, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jul. 11, 1977, Ser. No. 814,676

Claims priority, application Japan, Jul. 14, 1976, 51-83661[U]

Int. Cl.[2] H04N *5/79*

U.S. Cl. 358—8 **18 Claims**



1. In apparatus for recording periodic information signals comprised of first intervals and predetermined numbers of second intervals included in each of said first intervals and which are recorded in respective areas of successive parallel tracks on a record medium: the combination of means for providing said periodic information signals with a carrier having its phase selectively changed in one direction by a first amount $2\pi/N$ and in the opposite direction by a second amount $2\pi/M$, with N and M each being a whole number having an absolute value greater than 2 and which is positive to indicate a phase change in said one direction and negative to indicate a phase change in said opposite direction, and with N and M being selected to satisfy the equation $1/N-1/M=\frac{1}{2}$; and control means causing said first amount of phase change of the carrier for each of said second intervals of the information signals recorded in alternate ones of said parallel tracks and said second amount of phase change of the carrier for each of said second intervals of the information signals recorded in the remaining ones of said parallel tracks.

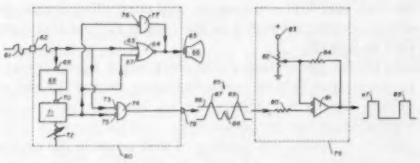
4,177,482
POPULATION AND PROFILE DATA OF BODIES IN A TRANSPARENT MASS

James W. Henry, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 790,792, Apr. 21, 1977, Pat. No. 4,121,247. This application Jun. 7, 1978, Ser. No. 913,401

Int. Cl.[2] H04N *7/18*

U.S. Cl. 358—93 **10 Claims**



1. Method of obtaining data of bodies contained within a transparent mass wherein said bodies and said mass have different indexes of refraction comprising

(a) moving a specimen of the mass containing said bodies into an optical viewing position wherein said specimen is intercepted by a columned beam of parallel light rays of a schlieren optical system whereby rays penetrating said mass are maintained in a columned state and rays penetrating said bodies are deviated from said columned beam of light to form an image of the profile of said bodies within said mass,

(b) detecting at least a portion of said deviated rays by a television camera, and converting the image into a video signal,

(c) electrically applying said video signal to the input of separator circuit means which is adapted to produce a control pulse on its output terminal of predetermined duration for each horizontal synchronization pulse contained in said video signal,

(d) electrically applying the video signal and the control pulse from the separator circuit means to separate input terminals of gate means adapted to pass said video signal through to its output terminal whenever said control pulse is applied to said second input terminal,

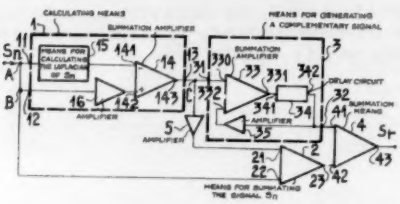
(e) electrically applying the output signal from said gate means to comparator means for converting all pulses of greater than a predetermined amplitude contained within said passed video signal into a digitized signal, and

(f) feeding the digitized signal into a digital computer whereby the signal is processed into said data.

4,177,483
PROCESS AND ARRANGEMENT FOR RECONSTITUTING THE THERMAL FLUX ABSORBED BY A PYROELECTRIC TARGET

Pierre Felix, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Jan. 10, 1978, Ser. No. 868,248
Claims priority, application France, Jan. 11, 1977, 77 00614
Int. Cl.[2] H04N 5/33
U.S. Cl. 358—113 9 Claims



1. An arrangement for reconstituting the signal representing the thermal flux absorbed by the sensitive surface of a camera system using the pyroelectric effect, comprising means for periodically reading said sensitive surface by successive frames and delivering a signal Sn for reading a point of co-ordinates x,y during the reading thereof in the course of a frame of order n, comprising:

means for correcting the signal Sn comprising means (1) for calculating a first component representing the Laplacian of the signal Sn and means (2) for summating said signal Sn with said first component, said correcting means delivering a corrected signal at the output (23) of said summation means (2),

means (3) for generating a complementary signal connected to the output (13) of said calculating means (1) and comprising means for generating on the one hand a signal representing the temperature θ_{n-1} of the point of co-ordinates x, y during the reading of said point in the course of a frame of order n−1 and, on the other hand, a second component representing the Laplacian of said temperature,

means (4) for summating said complementary signal and the corrected signal and delivering the reconstitute signal.

4,177,484
LARGE SCREEN TELEVISION

Daniel Q. Boje, Palisades Park, N.J., assignor to Agar International Ltd., Englewood Cliffs, N.J.

Filed May 16, 1977, Ser. No. 797,464
Int. Cl.[2] H04N 5/64, 5/74
U.S. Cl. 358—254 10 Claims

1. A large screen television system comprising:

a housing having a projection portion and a reflection portion interconnected at adjacent ends thereof to define a substantially L-shaped configuration;

said reflection portion including a top wall and a bottom wall interconnected by opposing side walls to define a horizontally extending compartment, said top and bottom walls diverging away from each other from a rear interconnecting junction line therebetween to provide a large front area defined by said top, bottom and side walls, said bottom wall having an opening therein;

said projection portion including a base wall with upwardly extending rear and front walls interconnected by side walls to define a vertically elongated container, said rear, front and side walls of said container being disposed around said bottom wall opening and being interconnected to said bottom wall of said reflection portion to provide communication between said container and said compartment;

support means positioned in said container on said base wall to receive a television set for retaining the television set in position with its screen facing upwardly towards said bottom wall opening, where a top portion of the screen is disposable adjacent to said rear wall of said container, and an opposite bottom portion of the screen is disposable adjacent to said front wall of said container;

said support means including adjustable yoke means for positioning about a periphery of the television set, and legs depending from said yoke means for support thereof;

a rear projection screen disposed across said large front area of said compartment, retaining means for securing said rear projection screen to said compartment;

reflective means disposed on an inside surface of said top wall of said compartment with said reflective means and said top wall being angularly positioned with respect to said rear projection screen for said reflective means to reflect an image from the television screen to said rear projection screen;

lens means disposed within said container for focusing a picture from the television screen through said bottom wall opening onto said reflective means so that a top portion of the picture is focused onto a top portion of said reflective means, and for projecting the image of the picture from said reflective means onto a rear surface of said rear projection screen to obtain an enlarged image of the picture received by the television set which can be viewed at a location in front of said rear projection screen; and

said lens means including a removable box-like member positionable on the television set to enclose the television screen, a tubular member connected to said box-like member and extending upwardly from said box-like member towards said reflective means, and a lens assembly adjustably fitting within said tubular member.

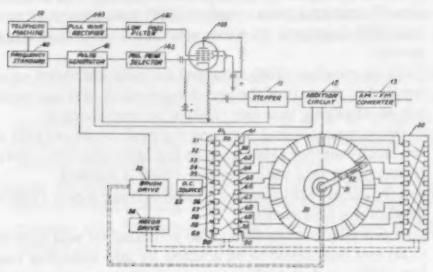
4,177,485
FACSIMILE APPARATUS

Lawrence D. Prehn, 30 Old Glebe Rd., Arlington, Va.

Filed Sep. 6, 1944, Ser. No. 552,858
Int. Cl.[2] H04N 1/44
U.S. Cl. 358—259 8 Claims

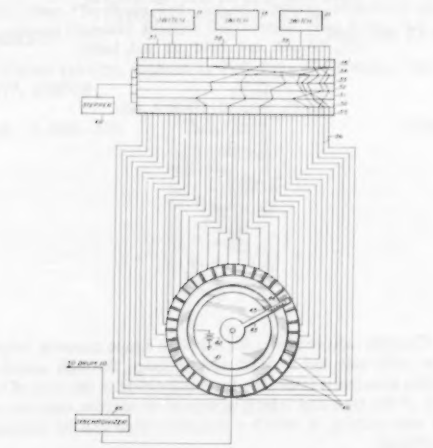
1. In a facsimile apparatus, means for producing a stepped signal, the amplitudes of the steps being substantially dependent upon the photographic density of the subject and the durations of the steps being predetermined, a combining circuit and means for introducing the stepped signal thereto, means for introducing a coding signal to said combining circuit including a series of contacts and means for applying electrical potentials thereto, means for making successive circuits between the several contacts and the combining circuit, the

durations of maintenance of the successive circuits being equal to the durations of the steps of the first mentioned signal, and



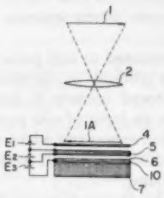
means for synchronizing the circuit making means with the first mentioned signal.

4,177,486
FACSIMILE DEVICE
Lawrence D. Prehn, OCSigO, 3C 340, The Pentagon, Washington 25, D.C. 20301
Filed Dec. 2, 1944, Ser. No. 566,382
Int. Cl.[2] H04N *1/44*
U.S. Cl. 358—259 **1 Claim**



1. In a facsimile system, a distributor including an array of n electrical contacts, a source of potential therefor and a normally rotating brush for applying potential from said source to said contacts in sequence, a plurality of cryptographic rotors in cascade, aid cascade having n input and n output contacts, means for connecting said distributor contacts to said input contacts in pairs and means for connecting said output contacts together in groups to provide a sequence of n-x output signals from said cascade, a plurality of n-x switches each normally open and closable responsive to an electrical signal, each said switch being controlled by a separate one of said cascade output signals, a facsimile device including a drum carrying a subject to be transmitted and at least one dummy subject, a plurality of n-x scanning devices cooperating with said drum and the subjects carried thereby normally to derive n-x facsimile signals, an output line common to said switches, and means for connecting said scanning devices to said switches in pairs thereby to deliver to said output line signal segments from said scanning devices in a sequence determined by the output signals from said cascade of rotors.

4,177,487
FACSIMILE SCANNER
Mutsuo Takenouchi; Takashi Ozawa; Syoji Wako, and Satoru Itoh, all of Ebina, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan
Filed Mar. 29, 1978, Ser. No. 891,249
Claims priority, application Japan, Apr. 11, 1977, 52/40440; Apr. 26, 1977, 52/437311; Apr. 26, 1977, 52/47312
Int. Cl.[2] H04N *1/04*
U.S. Cl. 358—294 **16 Claims**



9. An electro-optical picture signal processing system comprising:

an electron emission plane arranged in one-dimension,

a grid electrode to control passing of the electrons emitted from the electron emission plane;

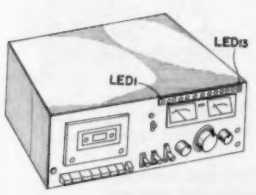
a number of secondary-electron multiplying devices, each of which has a cross section not larger than picture-element size and produces secondary-electrons in response to the incidence of photoelectrons from the electron emission plane,

an electric power source providing a voltage for accelerating secondary-electrons, and

an anode consisting of a number of segments as large as a picture-element, for capturing multiplied secondary-electrons,

wherein at least one of the electron emission plane and the grid electrode is divided into a number of picture-element size segment which are one-dimensionally scanned to select from one end to the other, and further a voltage between the electron emission plane and the grid electrode at selected segment portion is controlled in accordance with a time sequential picture signal.

4,177,488
MAGNETIC RECORDING AND PLAYBACK MEANS WITH INDICATION OF TAPE REMAINING
Koichi Sakai, Otsu, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed Jan. 17, 1978, Ser. No. 870,083
Claims priority, application Japan, Jan. 17, 1977, 52-4597[U]; Feb. 2, 1977, 52-11080; Feb. 3, 1977, 52-12222[U]
Int. Cl.[2] G11B *19/06, 27/14, 23/04*
U.S. Cl. 360—72.3 **7 Claims**



1. Magnetic recording and playback means employing tape cassette means in which electromagnetic tape is contained in a case, said recording and playback means comprising:

a supply reel stand for supporting a supply reel and rotatable to cause unwinding or winding of tape from or onto a supply reel on said supply reel stand;

a take-up reel stand for supporting a take-up reel and rotatable to cause winding or unwinding of tape onto or from a take-up reel on said take-up reel stand;

guide means for guiding said tape along a set path between said reel stands;

recording and playback means located near said path for effecting recording and playback of audio or video signals on or from the tape;

first pulse emission means operatively associated with one of said reel stands for emitting periodic pulses proportional to the rotation period of said one of said reel stands;

second pulse emission means separate from said first pulse emission means;

a ring counter connected to said pulse emission means and constituted by a plurality of cascade-connected flip-flops in which the stored content is shifted each time said counter receives an input of one pulse emitted by one of said pulse emission means and which are reset upon reception of a pulse emitted as output by the other of said pulse emission means; and

a plurality of display means disposed in a linear array, and each of which is connected with a corresponding flip-flop in said ring counter and is caused to light when the corresponding said flip-flop is set;

whereby said display means are caused to light in order starting from the display means connected to the flip-flop which is nearest the input terminals of said ring counter, and the number of said display means which is caused to light being proportional to the amount of tape unwound from said supply reel and wound onto said take-up reel, and the amount of tape remaining available for recording or playback is thereby indicated.

4,177,489

TAPE RUNNING MECHANISM PROVIDED WITH AUTOMATIC STOPPING DEVICE

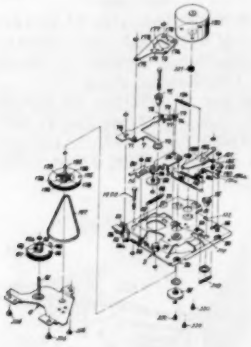
Isao Hasegawa, Toda, Japan, assignor to Clarion Co. Ltd., Saitama, Japan

Filed Jul. 11, 1977, Ser. No. 814,616

Claims priority, application Japan, Jul. 9, 1976, 51-80867; Jul. 9, 1976, 51-80868; Jul. 9, 1976, 51-90452[U]; Jul. 12, 1976, 51-91685[U]; Aug. 9, 1976, 51-93947; Aug. 11, 1976, 51-94765; Aug. 13, 1976, 51-107584[U]

Int. Cl.[2] G11B *15/18, 21/22*

U.S. Cl. 360—74.2 **22 Claims**



1. In a magnetic tape recorder having:

(a) a reel driving shaft (**61**) and

(b) a driving motor (**120**), an automatic stopping device comprising:

(i) a detection arm (**7**) mounted for pivoting about an axis parallel to the axis of said reel driving shaft,

(ii) means acting on said detection arm (**7**) for mechanically operating said arm (**7**) in response to the stopping of rotation of said reel driving shaft (**61**)

(iii) a push member (**180**) mounted for rotation about an axis parallel to the axis of the reel driving shaft (**61**)

(iv) a connecting lever (**181**) interconnecting said detection arm (**7**) and said push member (**180**) such that push member (**180**) is caused to move when said detection arm (**7**) moves

(v) a latch member (**186**) mounted for rotation about an axis parallel to the axis of the reel driving shaft (**61**) and including an engaging member (**189**) at an end thereof,

(vi) spring means acting between the push member (**180**) and the latch member (**186**) to urge the latch member (**186**) to rotate when said push member (**180**) is rotated,

(vii) a flywheel (**125**) coupled to said driving motor (**120**) for rotation by said motor,

(viii) a plurality of members (**128**) provided on said flywheel (**125**) and positioned to be abutted by said engaging member (**189**), and thereby prevent further rotation of the flywheel (**125**), when said latch member (**186**) is moved by said spring means as a result of movement of said push member (**180**) by said detection arm (**7**) detecting stoppage of rotation of said reel driving shaft (**61**).

4,177,490

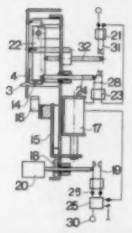
SWITCHING DEVICE FOR CASSETTE TAPE RECORDERS

Werner Broghammer, Tennenbronn, Fed. Rep. of Germany, assignor to Dual Gebruder Steidenger, St. Georgen, Fed. Rep. of Germany

Filed Feb. 6, 1978, Ser. No. 875,558

Int. Cl.[2] G11B *21/22, 15/18*

U.S. Cl. 360—105 **2 Claims**



1. Cassette tape recorder for use with a tape cassette, which on its wide side has at least one opening, through which a winding mandrel is insertable for engagement in the core of the spool of the tape and which in one of its narrow sides has at least one opening in which a magnetic head can be inserted, comprising

winding mandrel means for operative engagement with the spool in the cassette,

a magnetic head,

feed means displaceably mounted in a plane perpendicular to the axis of said winding mandrel means for transferring said magnetic head into an operative position such that said magnetic head enters into the opening in a narrow side of the cassette, said magnetic head being secured on said feed means,

first spring means biasing said feed means in a direction against displacement thereof into said operative position,

a first control means for transferring said feed means into said operative position when said first control means is moved to an actuated position,

a locking means for locking said first control means in said actuated position when said first control means is moved into said actuated position,

a second control means having a direction of actuation corresponding to the movement of a person's hand during grabbing of an inserted cassette, said second control means being arranged directly contiguous to the inserted cassette such that the cassette only can be grabbed after

said second control means has been moved in an actuated direction,

second spring means biasing said second control means in a direction against movement in said actuated direction,

said second control means being actuatable against said second spring means,

mounting means for mounting the cassette inserted in the cassette tape recorder, said mounting means being formed such that the inserted cassette can only be grabbed by hand for the purpose of removal by moving said second control means in said actuated direction,

means for transmitting a movement of said second control means to said locking means, whereby said locking means releases said first control means and said feed means is moved out of said operative position.

4,177,491

CLAMPING DEVICE FOR DISK-SHAPED MEMORY SHEETS

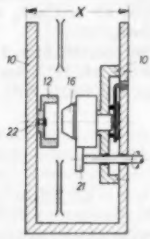
Emil Jahn, Pforzheim, Fed. Rep. of Germany, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Jan. 16, 1978, Ser. No. 869,823

Claims priority, application Fed. Rep. of Germany, Mar. 1, 1977, 2708798

Int. Cl.² G11B 5/82, 25/04

U.S. Cl. 360—135 **5 Claims**



1. A centering and clamping device for disk-shaped memory sheets having circular holes in the center thereof, said device comprising: a frame having side walls; a frusto-conical member rotatable on one side wall; a cup-shaped member mounted on another side wall having a recess facing said frusto-conical member concentric therewith, said cup-shaped member having a rim around said recess, the diameter of said frusto-conical member growing smaller in the direction of said cup-shaped member, said frusto-conical member being movable in opposite directions through and out of a memory sheet hole into and out of said recess to center the memory sheet, said frusto-conical member having a shoulder to clamp the inner memory sheet edge against said rim of said member, said members being pivotally mounted about the same axis; power means for rotating said frusto-conical member in either direction about said axis to project said frusto-conical member into and withdraw the same from said recess, respectively, to first and second limiting stop positions, respectively; and motion means including a torque limiter for converting said rotary movements of said frusto-conical member to said axial movements thereof, respectively.

4,177,492

ELECTRICAL PROTECTION CIRCUITS

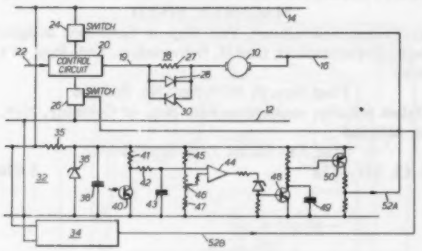
John Noddings, Coventry, and Michael D. Cox, Rugby, both of England, assignors to Associated Engineering Limited, England

Filed Jan. 16, 1978, Ser. No. 869,648

Claims priority, application United Kingdom, Feb. 8, 1977, 5069/77

Int. Cl.² H02H 3/08, 7/08

U.S. Cl. 361—31 **6 Claims**



1. An overload protection circuit arrangement for protecting against overload an electric motor having a power supply circuit and a mechanical actuator driven by the motor, comprising

bi-polar electrically responsive energy-output means connected in circuit with said power supply circuit so as to be responsive to a motor overload current of either polarity therein and to produce a non-electrical energy output corresponding to either such overload current,

transducing means operatively associated with said electrically responsive energy output means so as to be responsive to each said non-electrical energy output thereof and to produce a corresponding electrical control signal,

control means connected to be responsive to each said control signal and associated with said power supply circuit for interrupting the corresponding overload current in the motor, and

timing means operative in response to either said control signal for holding the motor current interrupted for at least a predetermined time delay and then allowing its reconnection.

4,177,493

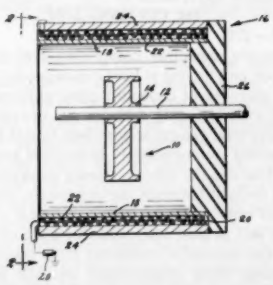
HIGH VOLTAGE ANTENNA PROTECTION SYSTEM

Emmanuel E. Bliamptis, Lexington, Mass., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Dec. 29, 1977, Ser. No. 865,753

Int. Cl.² H02H 7/20

U.S. Cl. 361—56 **5 Claims**



1. An apparatus for the protection of electrically charged

bodies against spurious overvoltages comprising a cup shaped housing; an electrically conductive shaft extending through one end of the housing, parallel to, but spaced away from the longitudinal axis of the housing; rotor means mounted on the shaft so that rotation of said rotor results in a progressively diminished air gap between the rotor and housing; means for connecting the shaft to an electrically charged body, and means for connecting the housing to ground.

4,177,494

CIRCUIT ARRANGEMENT FOR PRODUCING AN OPEN MAGNETIC FIELD

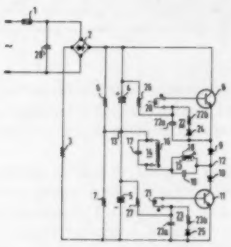
Rudy Tellert, Schweinfurt, Fed. Rep. of Germany, assignor to Sachs Systemtechnik GmbH, Schweinfurt, Fed. Rep. of Germany

Filed Nov. 8, 1977, Ser. No. 849,666

Claims priority, application Fed. Rep. of Germany, Nov. 11, 1976, 2651516

Int. Cl.[2] H02H 7/10; H02M 7/48

U.S. Cl. 361—152 **6 Claims**



1. In apparatus for producing a magnetic field for coupling to a load, said apparatus having at least a first and second amplifier element operating in phase opposition, and first oscillating circuit means connected to said first and second amplifier element for generating a first oscillating voltage having a predetermined fundamental frequency, said first oscillating circuit means comprising inductor means for producing said magnetic field, the improvement which comprises second oscillating circuit means connected to said first oscillating circuit means for furnishing a second oscillating voltage having a frequency corresponding to the third harmonic of said fundamental frequency, said second oscillating circuit means comprising a coil positioned relative to said load such that substantially no energy is transferred from said coil to said load.

4,177,495

VARIABLE ELECTRIC CAPACITOR

Maurice Perret, Avenches, Switzerland, assignor to Gesellschaft fur elektronische Rohren Comet Bern, Switzerland

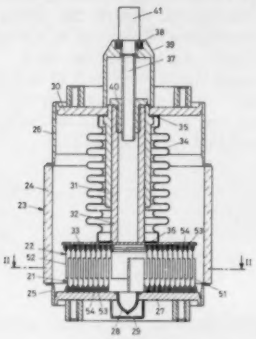
Filed Aug. 9, 1977, Ser. No. 823,323

Claims priority, application Switzerland, Aug. 25, 1976, 10748/76; Jun. 7, 1977, 6973/77

Int. Cl.[2] H01G 5/14

U.S. Cl. 361—279 **6 Claims**

1. An electric capacitor comprising two electrode units, each electrode unit having at least one capacitor plate arranged such that a plurality of capacitor plate portions with parallel mutually oppositely facing surfaces are provided, and a support for said at least one capacitor plate, said at least one capacitor plate having two oppositely positioned lateral edges, one of which is free and the other is fixedly secured to the support, a gap being defined between the oppositely facing surfaces of the capacitor plate portions, said gap being greater than the thickness of said at least one capacitor plate of the other electrode unit, the respective capacitor plate portions of the two electrode units being intermeshed and the mutually facing surfaces of the capacitor plate portions being parallel to a straight line along which one electrode unit is adjustable relative to the other for varying the extent of intermeshing of the capacitor plate portions of both electrode units, guiding means being provided at each electrode unit adjacent said support, said guiding means being arranged to engage the free lateral edge of said at least one capacitor plate of the other electrode unit for individually centering all capacitor plate portions of each electrode unit with respect to the capacitor plate portions



of the other electrode unit when the two electrode units are set to a maximum extent of intermeshing of their capacitor plate portions while in other settings of the electrode units the guiding means are out of engagement with said at least one capacitor plate of the other electrode unit, at least one body being connected to the support for said at least one capacitor plate of each electrode unit and including grooves having flanks which constitute said guiding means.

4,177,496

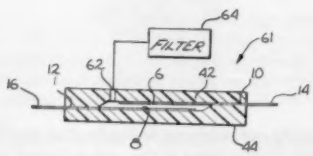
CAPACITIVE PRESSURE TRANSDUCER

Robert L. Bell, Chatsworth; Robert Willing, Anaheim, and Fred Kavli, Woodland Hills, all of Calif., assignors to Kavlico Corporation, Chatsworth, Calif.

Continuation of Ser. No. 666,188, Mar. 12, 1976, abandoned. This application Sep. 19, 1977, Ser. No. 834,498

Int. Cl.[2] H01G 7/00

U.S. Cl. 361—283 **10 Claims**



1. A capacitive pressure transducer comprising, in combination, a pair of essentially zero hysteresis nonconductive electrically insulative members, at least one of said electrically insulative members comprising an elastic diaphragm defining a substantially planar inner surface and having a continuous solid cross-section, the other of said electrically insulative members defining a substantially planar inner surface and having a substantially continuous solid cross-section, said electrically insulative members being disposed in vertically aligned, stacked relationship with marginal edge portions in overlying relationship and with said inner surfaces in spaced apart parallel relationship to define a gap, seal means comprising a fired glass frit having a thickness ranging from about 0.1 milinch to 20 milinch bonding said overlying edge portions together in sealed relationship having a predetermined spacing and fixing said electrically insulative members in a parallel relationship, said frit and insulative members being of substantially similar materials from the standpoint of coefficient of thermal expansion, a planar layer of conductive material secured on each of said

inner surfaces, each of said layers of conductive material comprising a central conductive portion and a co-planar conductive path portion extending from said central portion for connection to external leads, said central conductive portions on said inner surfaces being disposed in vertically aligned, spaced apart parallel relationship to form a capacitor having a capacitance which varies according to the substantially transverse flexing of said elastic diaphragm toward the other member in response to pressure, with the gap being dimensioned between 0.1 milinches to 20 milinches and the diaphragm being constructed to enable said diaphragm to bottom out when a pressure in excess of a predetermined pressure is applied to the transducer so as to avoid damaging stress on said transducer.

4,177,497

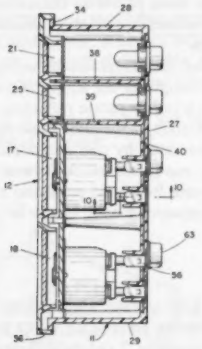
INSTRUMENT CLUSTER ASSEMBLY

Thomas J. McCook, Wilmette, and John F. Shragal, River Grove, both of Ill., assignors to Stewart-Warner Corporation, Chicago, Ill.

Continuation of Ser. No. 690,636, May 27, 1976, abandoned, which is a continuation of Ser. No. 522,023, Nov. 8, 1974, abandoned. This application Dec. 29, 1977, Ser. No. 865,636

Int. Cl.[2] H02B *1/04*

U.S. Cl. 361—331 **6 Claims**



1. An indicator assembly, comprising; housing means, a plurality of indicators mounted on said housing means, each of said indicators having electrical connectors, terminals in said housing means providing current to said indicators, a conductive standard circuit plate permanently carried by said housing means and providing electrical circuit paths for said indicators through said connectors from said terminals, said paths being provided by relatively narrow cut-out portions in said plate and conductor paths in said plate that are substantially wider than the cut-out portions, said housing means being constructed of plastic, said cut-out portions each having a small bridge portion of plate along their length, said housing means having a plurality of apertures therein, each positioned adjacent one of the bridge portions so that the bridge portions are visable from outside the housing and may be selectively removed to achieve different circuit patterns from a standard circuit plate, and said circuit paths being insert molded in said housing means.

4,177,498

CONTROL PANEL FOR VEHICLE ENTERTAINMENT SERVICE SYSTEMS

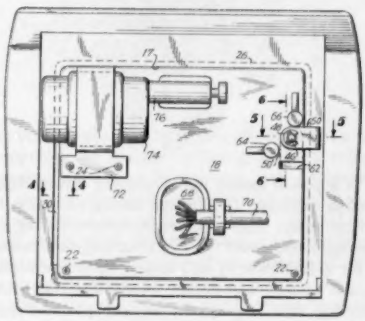
Harry Weitz, New Hyde Park, N.Y., assignor to Instrument Systems Corporation, Huntington, N.Y.

Filed Mar. 10, 1978, Ser. No. 885,419

Int. Cl.[2] H02B *1/04*

U.S. Cl. 361—360 **13 Claims**

1. A control panel for mounting in an opening in a support defined on at least two sides by first and second rim portions, comprising frame means dimensioned for receipt in the opening and formed with a slot in one side thereof dimensioned for receipt of the first rim portion, said frame means being further formed with a projection on a side thereof positioned for engagement against the front surface of the second rim portion; circuit means carried by said frame means for performing a control function; bolt means threadably engaged to said frame means adjacent said projection and formed with a head portion accessable from the front of said control panel for the manual pivoting thereof between first and second positions; and dog



means fixed to said bolt means for displacement in response to the pivoting of said bolt means relative to said frame means between said first position at which said dog means engages against the rear surface of the second rim portion for retaining the second rim portion between said dog means and said projection, and said second position at which said dog means is displaced both axially and pivotably relative to the axis of said bolt means away from and out of registration with the second rim portion, whereby said control panel may be readily removed from the support when said dog means is in said second position.

4,177,499

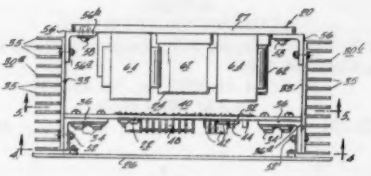
ELECTRONIC ASSEMBLY WITH HEAT SINK MEANS

Werner K. Volkmann, Media, Pa., assignor to Volkmann Electric Drives Corporation, Folcroft, Pa.

Filed Nov. 14, 1977, Ser. No. 850,911

Int. Cl.[2] H05K *7/20*

U.S. Cl. 361—388 **5 Claims**

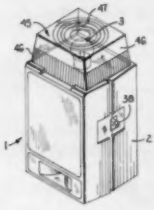


1. An electronic assembly consisting of at least a pair of modules interconnected by means permitting ease of assembly and disassembly, one of said modules comprising a pair of spaced heat sinks, a printed circuit board mounted by first bracket support means between said heat sinks, electronic components on the upper face of said printed circuit board including high heat generating elements supported by said first bracket support means along side edges of said printed circuit board in close proximity to said heat sinks, the other module including a base underlying said printed circuit board and mounting electronic components on a face thereof and second bracket means carried by said heat sinks and secured to said base, said heat sinks thereby forming side enclosures for said assembly.

4,177,500
POWER FAILURE LIGHT AND CIRCUIT THEREFOR

Thomas H. Nicholl, 1204 W. 27 St., Kansas City, Mo. 64108, and John J. Collins, Kansas City, Mo., assignors to Thomas H. Nicholl, Kansas City, Mo.

Filed Sep. 29, 1978, Ser. No. 947,261
Int. Cl.[2] F21V *19/04*
U.S. Cl. 362—20 13 Claims



1. In a power failure light including power supply means providing pulsating DC current during reception thereby of electrical power from a power receptacle having said power failure light connected thereto; a rechargeable battery; a light bulb for illumination by said battery upon interruption of said electrical power; and circuit means including diode means connecting said battery across said power supply means whereby said battery receives charging current therefrom and transistor means connecting said light bulb across said battery and effecting conduction of current from said battery through said bulb, illuminating same, upon said interruption of said power, said transistor means having a base-emitter junction, suitable forward bias of said junction effecting said illumination of said bulb; the improvement comprising:

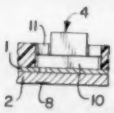
(a) said junction being connected across said diode means, said diode means having a pulsed voltage thereacross during the occurrences of the DC pulses of said charging current, the voltage pulses appearing across said junction and biasing said transistor means into a non-conductive state thereby preventing said illumination of said bulb; and

(b) timing means connected across junction and across said power supply means, said timing means maintaining the non-conductive state of said transistor means between the occurrences of said voltage pulses across said junction and providing suitable bias to said junction after said interruption of power to thereby effect said illumination of said bulb.

4,177,501
ILLUMINATED KEYBOARD

James H. Karlin, Fairport, N.Y., assignor to Harris Corporation, Cleveland, Ohio

Filed Nov. 15, 1977, Ser. No. 851,694
Int. Cl.[2] G01D *11/28*
U.S. Cl. 362—26 23 Claims



1. An illuminating arrangement comprising:

light-pipe means formed of a light transmitting material having front and rear surfaces,

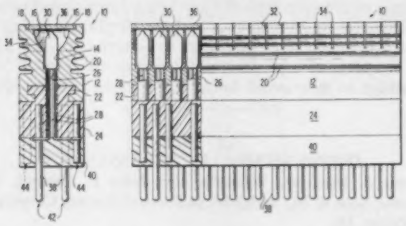
a light source means for edge-lighting said light-pipe means, and

surface means for deflecting light from said light source through said front surface comprising roughened portions of said rear surface.

4,177,502
INCANDESCENT BAR DISPLAY MODULE

Benjamin E. Hiscock, S. Burlington, Vt., assignor to Simmonds Precision Products, Inc., Tarrytown, N.Y.

Filed Jul. 19, 1977, Ser. No. 817,457
Int. Cl.[2] F21S *2/00, 3/00;* F21V *11/00, 7/00*
U.S. Cl. 362—218 7 Claims



1. A display comprising a plurality of lighted segments aligned to form an incandescent bar display comprising,

a lamp block having a base portion provided with an aligned row of apertures, said base portion merging into concave sidewalls to form parabolic reflectors;

a plurality of incandescent lamps located in said aligned row of apertures

means defining barrier plates mounted in a series of cuts arranged throughout the length of said block to sectionalize the block into separate reflectors for each lamp,

cooling fins formed on outside of said lamp block to dissipate the heat generated by said incandescent lamps,

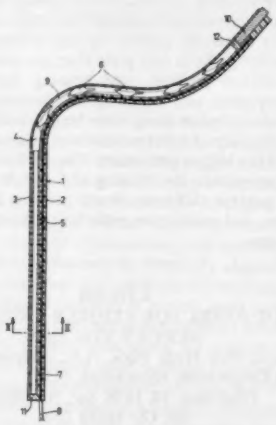
an insulating connector block formed on the side of said block opposite from said parabolic reflectors; and

means for connecting said lamps to a suitable source of power.

4,177,503
DEVICE FOR LOCATING AND RETRIEVING METALLIC PARTS FROM DIFFICULT TO REACH AREAS

Jacques L. V. Anquetin, 7 rue de la Gouttiere, 78640 Neauphle le Chateau, France

Filed Nov. 3, 1978, Ser. No. 957,365
Claims priority, application France, Nov. 7, 1977, 77 33449
Int. Cl.[2] F21V *1/00*
U.S. Cl. 362—236 4 Claims



1. A device for locating and retrieving metallic parts from places which are difficult to reach comprising, a section made

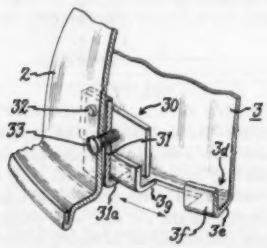
of transparent or translucent flexible plastic material and having a longitudinal cylindrical cavity enclosing along part of its length from one end of the section, a series of small electric bulbs distributed along the length of the section and energized from two longitudinal electrical conductors embedded in the section beside said cavity, and by conductors connecting the bulbs to the two longitudinal conductors, said cavity enclosing, in the remainder of the length of the section, a cylindrical tube of rigid plastic material whose outside diameter is approximately equal to that of the cavity, said cylindrical cavity encloses, at an end of the section remote from the tube, a permanent cylindrical magnet whose diameter is approximately the same as that of the cavity, at least one of the two longitudinal electrical conductors being bendable but sufficiently rigid to maintain in the portion of the section located between the rigid tube and the magnet any bends formed in this portion of the section.

4,177,504

LUMINAIRE REFLECTOR MOUNTING FOR ROTATION OF ASYMMETRIC REFLECTOR

Alfred J. Henderson, Jr., Chagrin Falls, Ohio, and Thomas A. Fletcher, Dana, N.C., assignors to General Electric Company, Schenectady, N.Y.

Filed Nov. 4, 1977, Ser. No. 848,544
Int. Cl.² F21V *17/02*
U.S. Cl. 362—282 **5 Claims**



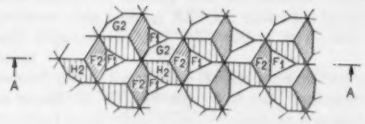
1. A luminaire comprising, in combination, a concave housing having a bottom opening, a concave reflector arranged within said housing and having a rim defining a bottom opening substantially coaxial with the bottom opening of said housing, the rim of said reflector being substantially channel-shaped and being formed with an annular flange projecting upwardly and spaced outwardly from the reflector, means for removably mounting a lamp in said reflector, said reflector being rotatably adjustable within said housing about the axis thereof, and a plurality of circumferentially spaced fastening means adjustably securing said reflector rim flange to said housing for holding said reflector in different rotational positions relative to said housing, whereby the light distribution from said reflector may be varied, each said fastening means including support means secured to and having a portion projecting radially inwardly from said housing for supporting said reflector, said reflector being formed in said rim thereof with circumferentially spaced, outwardly open recesses, said recesses being sufficiently large for passage therethrough of said radially projecting support portions when said reflector is removed from and inserted into said housing, each said fastening means including a clamp member adjustably attached to said housing for releasably clamping said reflector rim flange to said housing.

4,177,505

INDICATOR LIGHT WITH INCORPORATED CATADIOPTRIC ELEMENT FOR AUTOMOBILE

Pierre Carel, Le Petit Clamart, France, assignor to Cibie Projecteurs, Bobigny, France

Filed Dec. 19, 1977, Ser. No. 861,782
Claims priority, application France, Jan. 24, 1977, 77 01895
Int. Cl.² F21V *7/00*
U.S. Cl. 362—309 **5 Claims**



1. In an indicator light with a catadioptric element for automobiles comprising an exterior diffusing glass, a reflector having a longitudinal axis, a light source, and a transparent catadioptric element placed transversely with respect to said axis so as to intercept a part of the light beam reflected by the reflector, said catadioptric element having a substantially flat outer face and an inner face composed of a plurality of prisms, located in a useful illumination window zone, separated by flat surfaces parallel to the outer surface, said flat surfaces allowing the emission by light of an illuminating flow centered on the axis of said reflector;

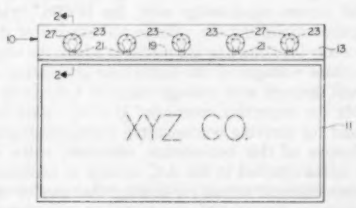
the improvement comprising said catadioptric prisms each presenting one facet defining with the outer surface of the catadioptric element a deflector prism which deviates light rays emitting a second illumination flow adjacent the first illuminating flow.

4,177,506

ILLUMINATED BAR FOR AN ADVERTISING SIGN

Jimmy W. Easterling, P.O. Box 1248, Clanton, Ala. 35045

Filed May 22, 1978, Ser. No. 908,201
Int. Cl.² F21S *1/12*
U.S. Cl. 362—414 **4 Claims**



1. An illuminated bar for use with an advertising sign, said bar comprising,

(a) an elongated housing having spaced apart upstanding side members,

(b) means mounting at least one electric lamp between said upstanding side members, and

(c) longitudinally spaced magnifying lenses carried by each said upstanding side member at opposite sides of said lamp with each of said lenses being opposite one of a plurality of longitudinally spaced openings in said side members in position to transmit and magnify light emitted at said opposite sides of said lamp.

4,177,507

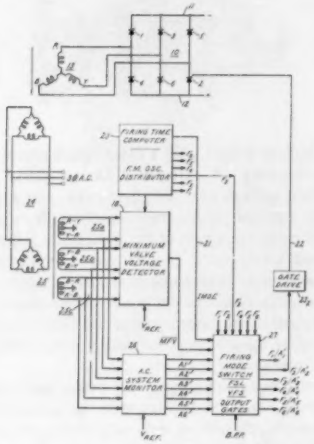
METHOD AND CONTROL FOR MAINTAINING OPTIMUM PERFORMANCE OF HVDC POWER TRANSMISSION SYSTEMS AT RECTIFIER END DURING A. C. SYSTEM FAULT

Bernard D. Leete, Newtown Square, Pa., assignor to General Electric Company, Philadelphia, Pa.

Filed Mar. 22, 1978, Ser. No. 889,157

Int. Cl.[2] H02M 7/155

U.S. Cl. 363—51 **21 Claims**



1. In an HVDC power converter comprising a plurality of valves connected in an HVDC bridge arrangement intermediate a multiphase alternating current system and at least one HVDC power conductor link together with gating circuit means for gating-on respective ones of said valves during selected intervals of the alternating current periods of the respective phases, the said gating circuit means including equidistant-spaced gate firing pulse generating means for supplying equidistant-spaced gating-on firing pulses to gate drive circuit means for the respective valves of the HVDC bridge power converter during normal operation of the converter in the presence of symmetrically-shaped A.C. system voltage waveforms; the improvement comprising firing mode switch means connected intermediate the equidistant-spaced gate firing pulse generating means and the gate drive means for the respective valves, A.C. system monitor means coupled to the A.C. system in parallel circuit relationship with the HVDC bridge for reducing and monitoring the voltage waveshapes of the A.C. system voltage for detecting the points at which the respective phase-to-phase voltages of the multiphase alternating current system pass through zero voltage value in a direction which will enable the respective associated HVDC valves for conduction and for deriving commutating voltage-indicating signals indicative of this occurrence, minimum valve voltage detector means coupled to the A.C. system in addition to the A.C. system monitor means for sensing that any of the A.C. system phase-to-phase voltages are below a predetermined minimum safe level required to assure safe operation of the HVDC power converter and deriving an output minimum valve voltage alarm signal under conditions where the minimum safe level has not been attained by the voltage across any one of the HVDC valves, and means for applying the output minimum valve voltage alarm signal to the firing mode switch means for controlling the operating thereof; said firing mode switch means including means for effectively removing the normal equidistant-spaced firing pulses from effective application to the gate drives of the respective HVDC valves and effectively coupling said commutating voltage-indicating signals for the respective phases to the gate drive means for the respective HVDC valves in the presence of a minimum valve voltage alarm signal for use as gating-on firing pulses for the HVDC valves under conditions where asymmetries occur in the A.C. system voltage waveforms due to transient disturbances affecting the system, said firing mode switch means further automatically decoupling said commutating voltage indicating signals from the gate drives for the HVDC valves upon termination of the minimum valve voltage alarm signal and reapplying the normal equidistant-spaced firing pulses thereto.

4,177,508

APPARATUS FOR BALANCING AN ASYMMETRICAL LOAD

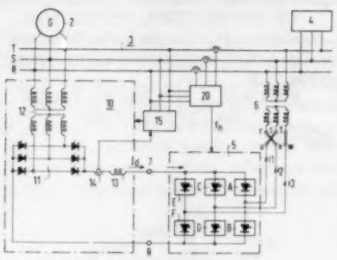
Eberhard Schmid, Dormitz, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Feb. 21, 1978, Ser. No. 879,590

Claims priority, application Fed. Rep. of Germany, Feb. 25, 1977, 2708305

Int. Cl.[2] H02J 3/26

U.S. Cl. 363—78 **10 Claims**



1. Apparatus for use in balancing an asymmetrical load which is supplied from a three-phase network comprising:

a self commutating converter for generating a three-phase output current system on the a-c side and which is adapted to be connected on the a-c side with phases reversed to said network, said converter including controllable valves which are arranged in a bridge circuit and are adapted for forced quenching;

a d-c source connected to the d-c side of said converter and coupling thereto a constant d-c current corresponding to the maximum asymmetry power to be balanced;

a control device for controlling said converter such that the phase and amplitude of the fundamental of the three phase output current system thereof are dependent, respectively, on the phase and amplitude of the countercurrent system required for balancing, said control device including:

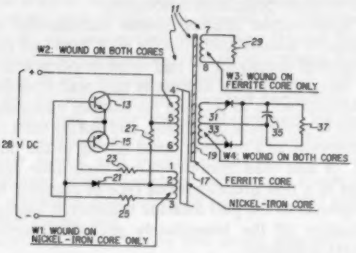
a first control means having a pulse program for firing and extinguishing the valves of said converter;

a second control means responsive to the a-c voltage and a-c current of said network for determining the phase and amplitude of said required countercurrent system and for controlling the pulse widths of the pulses of said program of said first control means to effect a change in the amplitude of the fundamental of said three phase output current system in dependence on said determined amplitude of said countercurrent system and for controlling the phase of the pulse program relative to the zero crossings of the a-c voltage of said network to effect a change in the phase of the fundamental of said three phase output current system in dependence on said determined phase of said countercurrent system.

4,177,509
SELF-EXCITED INVERTER WITH SUPPRESSED CURRENT SPIKES

Johannes Bullinga, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 26, 1978, Ser. No. 955,277
Int. Cl.[2] H02M 7/537
U.S. Cl. 363—133 **14 Claims**


W2: WOUND ON BOTH CORES
W3: WOUND ON FERRITE CORE ONLY
W4: WOUND ON BOTH CORES
FERRITE CORE
NICKEL-IRON CORE
W1: WOUND ON NICKEL-IRON CORE ONLY
28 V DC

1. A free-running inverter comprising:

transformer means comprising (a) first and second magnetic cores, said first core requiring less magnetizing force than the second core to become saturated, (b) a primary first winding wound around both cores, (c) a secondary second winding wound around both cores, and (d) a feedback third winding wound around only said first core, and

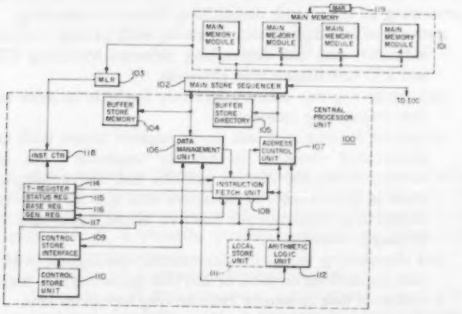
switch means having on and off states for alternately connecting a DC voltage source to said first winding and then, in response to said first core saturation, disallowing said connection,

said third winding being connected for supplying to said switch means all the voltage or current necessary for driving said switch means between and during its on and off states.

4,177,510
PROTECTION OF DATA IN AN INFORMATION MULTIPROCESSING SYSTEM BY IMPLEMENTING A CONCEPT OF RINGS TO REPRESENT THE DIFFERENT LEVELS OF PRIVILEGES AMONG PROCESSES

Marc Appell, Paris; Georges Lepicard, Vaucresson; Philippe-Hubert de Rivet, Paris; John J. Bradley, Garches, all of France, and Benjamin S. Franklin, Cambridge, Mass., assignors to Compagnie Internationale pour l'Informatique, CII Honeywell Bull, Paris, France

Filed Dec. 2, 1974, Ser. No. 528,953
Claims priority, application France, Nov. 30, 1973, 73 42706
Int. Cl.[2] G06F 9/18, 9/20
U.S. Cl. 364—200 **11 Claims**



1. In an automatic data processing apparatus for processing information, including a virtual memory having stored therein a plurality of different types of groups of information, each information group-type associated with an address space in said virtual memory bounded by a segment having adjustable bounds, said information being protected against unauthorized uses by a hierarchy of concentric ring levels (i.e. levels of privilege) wherein each group-type of information is associated with a predetermined ring number indicative of a level of privilege, said level of privilege decreasing as the associated ring number increases, an apparatus for generating a write-violation-exception signal comprising:

(a) first means for storing first information indicating the maximum ring number RD (i.e. minimum level of privilege) required to read invormation from said selected group;

(b) second means for storing second information indicating the maximum ring number WR (i.e. minimum level of privilege) required to write information into said selected group;

(c) third means for storing third information indicating the maximum ring number MAXR (i.e. minimum level of privilege) required to process information from said selected group;

(d) fourth means interconnecting said first, second and third means, for determining the maximum of the contents of said first, second and third means, whereby an effective address ring number EAR is generated;

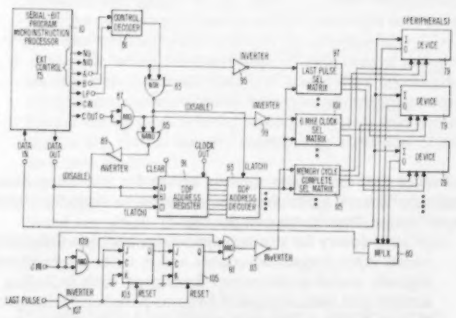
(e) fifth means connected with said second means, for comparing the effective address ring number EAR with the write ring number WR; and,

(f) sixth means connected with said fifth means for generating a write-violation-exception signal when EAR is greater than WR.

4,177,511
PORT SELECT UNIT FOR A PROGRAMMABLE SERIAL-BIT MICROPROCESSOR

Vincent J. Taddei, West Chester, Pa., assignor to Burroughs Corporation, Detroit, Mich.

Filed Sep. 4, 1974, Ser. No. 503,111
Int. Cl.[2] G06F 3/04
U.S. Cl. 364—200 **4 Claims**



1. An apparatus for establishing communication paths between a plurality of peripheral devices and a serial-bit data processor, said processor including means for providing external interface control signals and serial peripheral designation information, each of said plurality of peripheral devices being enabled for communications with said processor responsive to said external interface control signals, comprising:

means for transforming said serial designation information from said processor to parallel information;

means connected to said transforming means for decoding said transformed designation information;

means connected to said plurality of peripheral devices and to said means for providing said external interface control signals and responsive to said decoding means for selectively gating said control signals to said plurality of pe-

ripheral devices in accordance with said decoded designation information, said means for selectively gating including;

a first matrix connected between said means for providing external interface signals and said plurality of peripheral devices and responsive to said decoding means for providing a given one of said external interface control signals to said one of said plurality of peripheral devices specified by said decoded designation information,

a second matrix connected between said means for providing external interface signals and said plurality of peripheral devices and responsive to said decoding means for providing a second given one of said external interface control signals to said one of said plurality of peripheral devices specified by said decoded designation information, and

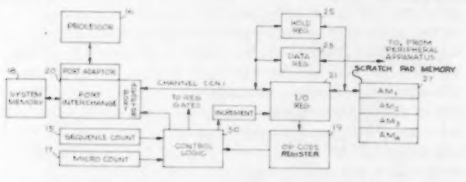
a third matrix connected between said means for providing external interface signals and said plurality of peripheral devices and responsive to said decoding means for providing a third given one of said external interface control signals to said one of said plurality of peripheral devices specified by said decoded designation information, said communications path being enabled only when said one of said plurality of peripheral devices specified by said decoded designation information has received said given one, said second given one and said third given one of said external interface control signals; and

means responsive to said selectively gated control signals for enabling a communications path between said processor and one of said plurality of peripheral devices specified by said decoded designation information.

4,177,512
SOFT INPUT/OUTPUT AUTO POLL SYSTEM

Richard A. Moggia, Goleta, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed Mar. 12, 1976, Ser. No. 666,413
Int. Cl.[2] G06F *3/04, 13/00*
U.S. Cl. 364—200 **3 Claims**



1. In a data processing system, means for providing automatic polling of a peripheral in response to digitally coded input/output descriptors comprising:

a system memory for storing a read-from-peripheral digitally coded input/output descriptor and a write-to-peripheral digitally coded input/output descriptor, each including a settable poll indication, said write-to-peripheral descriptor also including a linking address to said read-from-peripheral descriptor, and said read-from-peripheral descriptor also including a linking address to said write-to-peripheral descriptor, said write-to-peripheral descriptor additionally including poll message addresses of a plurality of poll messages stored in said memory, and further including a pointer address pointing to a particular one of said poll message addresses; and

input/output control means for controlling the transfer of data between said memory and said peripheral;

said input/output control means including means for fetching said write-to-peripheral descriptor from said memory and in response to the detection of a predetermined setting of the poll indication of the fetched write-to-peripheral descriptor causing the poll message pointed to by the pointer address to be transferred to said peripheral following which the pointer address is modified to point to another poll message;

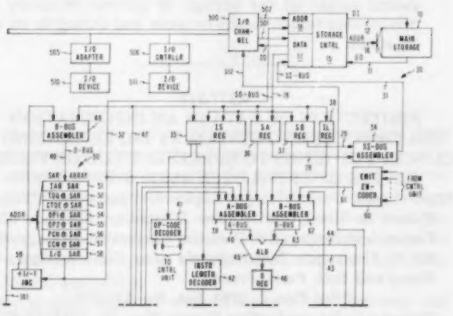
said input/output control means also including means for automatically fetching said read-from-peripheral descriptor from said memory in response to the linking address of the fetched write-to-peripheral descriptor and for executing the fetched read-from-peripheral descriptor so as to provide for the transfer from said peripheral of a response to the poll message transferred thereto during execution of said write-to-peripheral descriptor;

said input/output control means additionally including means for automatically linking back from said read-from-peripheral descriptor to said write-to-peripheral descriptor using the linking address of said read-from-peripheral descriptor so as to provide for another execution of said write-to-peripheral descriptor, said linking back occurring in response to a predetermined setting of the poll indication of said read-from-peripheral descriptor and the receipt of a first predetermined type of response from said peripheral to the poll message transferred thereto during execution of the immediately preceding write-to-peripheral descriptor.

4,177,513
TASK HANDLING APPARATUS FOR A COMPUTER SYSTEM

Roy L. Hoffman, Pine Island; William G. Kempke, Rochester; John W. McCullough, Rochester; Frank G. Soltis, Rochester, and Richard T. Turner, Rochester, all of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jul. 8, 1977, Ser. No. 813,901
Int. Cl.[2] G06F *9/18*
U.S. Cl. 364—200 **9 Claims**



1. Task handling apparatus in a computer system having main storage interconnected with a central processing unit (CPU) and I/O units, where said CPU includes means for processing an active task dispatching element comprising:

a source of task dispatching elements, each having a priority indicator, said task dispatching elements including CPU and I/O task dispatching elements,

task queue register means selectively loadable to store said task dispatching elements,

means for loading said task queue register means with task dispatching elements in priority sequence from said source, where the highest priority task dispatching element is dispatchable as an active task and all other task dispatching elements are inactive dispatchable task dispatching elements,

task dispatching means for determining the highest priority task dispatching element in said task queue register means,

a source of task messages, each having a priority key,

intertask communication queue register means selectively loadable with task dispatching elements and with task messages,

intertask communication means comprising send means

activatable by said active task dispatching element for loading messages from said source of messages in said intertask communication queue register means and for unloading task dispatching elements from said intertask communication queue register means and loading said unloaded task dispatching elements in priority sequence in said task queue register means, said send means activating said task dispatching means whenever said send means loads one or more task dispatching elements in said task queue register means, and receive means activatable by said active task dispatching element for unloading messages for said active task dispatching element from said intertask communication queue register means and in the absence of any message for said active task dispatching element for unloading said active task dispatching element from said task queue register means and loading it in priority sequence in said intertask communication queue register means, said receive means activating said task dispatching means whenever said receive means unloads said active task dispatching element from said task queue register means, and

task switching means having first means responsive to said task dispatching means having been activated in response to said send means loading said task queue register means with a task dispatching element and said task dispatching means having determined that said loaded task dispatching element has a priority higher than the priority of said active task dispatching element for making said active task dispatching element inactive dispatchable and said higher priority loaded task dispatching element an active task dispatching element and having second means responsive to said task dispatching means having been activated in response to said receive means unloading said active task dispatching element from said task queue register means for making the highest priority task dispatching element remaining in said task queue register means an active task dispatching element.

4,177,514

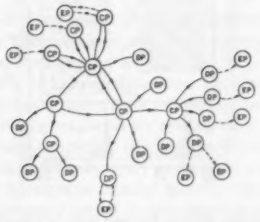
GRAPH ARCHITECTURE INFORMATION PROCESSING SYSTEM

Charle R. Rupp, Pittsfield, Mass., assignor to General Electric Company

Continuation of Ser. No. 741,421, Nov. 12, 1976, abandoned, which is a continuation-in-part of Ser. No. 707,721, Jul. 21, 1976, abandoned. This application Nov. 22, 1977, Ser. No. 853,880

Int. Cl.[2] G06F *15/16, 15/34*

U.S. Cl. 364—200 **18 Claims**



1. A distributive function information processing system made up of interconnected processing elements for use in combination with one or more input or output devices such as display devices, keyboards, printers, cathode ray tubes and data links, comprising:

a. a plurality of processing elements including:

(1) one or more data processors for receiving, transforming and transmitting data in response to control signals, and

(2) two or more control processors for generating and transmitting control signals for operating said system;

b. a plurality of control arcs interconnecting said processing elements into a system, each said control arc consisting of:

(1) control arc logic circuitry for generating and transmitting said control signals constituting a control arc transmitter,

(2) control arc logic circuitry for receiving and interpreting said control signals constituting a control arc receiver, and

(3) electrical connectors constituting control arc communication lines interconnecting said control arc transmitter and said control arc receiver into a control arc for conveying said control signals from transmitter to the receiver and for conveying responses to said control signals from receiver to transmitter whereby each control arc can pass said control signals in the direction from transmitter to receiver,

said control arc logic circuits being located in and forming a part of said processing elements with the two logic circuits of each control arc being located in a different processing element with control arc transmitters being located only in said control processors, with control arc receivers being located in either control processors or data processors and with at least one control processor containing a control arc receiver whereby each control arc interconnects two processing elements for interconnecting said processing elements into said system,

wherein the number of control arcs is equal to or greater than the total number of control and data processors, wherein said control arcs interconnecting two or more of the processing elements in a system describe a loop and wherein one said control processor includes, in addition to the control arc logic circuitry constituting a portion of one or more said control arcs, state defined control circuitry permitting said one control processor to assume, in turn, two or more different states to have state defined control whereby the control function performed by said one control processor depends in part on its state;

c. input and output data lines for connecting one or more processing elements with one or more said input or output devices wherein the network created by processing elements when interconnected by said control arcs defines a mathematical graph in the sense of graph mathematics over the processing elements and wherein said processing elements constitute the nodes of the graph; and

d. data path means for movement of data among said processing elements, said electrical connectors constituting control arc communication lines also constituting means for movement of data in the same direction as said control signals are moved thereby constituting a portion of said data path means;

whereby said system may accept data from said input device, operate and transform data using a control scheme based on graph theory mathematics and produce data usable by said output device.

4,177,515

INTERRUPT ADAPTER FOR DATA PROCESSING SYSTEMS

Alfred D. Jenkins, and Edward W. Schade, Jr., both of Cambridge, Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Dec. 23, 1977, Ser. No. 864,044

Int. Cl.[2] G06F *9/18*

U.S. Cl. 364—200 **5 Claims**

1. In a data processing system having a central processor and a plurality of data terminal devices each having a request line for signalling the central processor to request exchange of information comprising,

an interface device coupled to said central processor over a communication line;

a microprocessor located on said interface device;

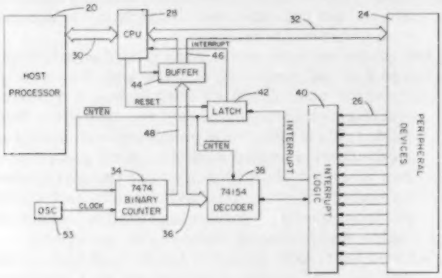
first gating means connected in series to each request line of said data terminal devices for outputting an exchange

request signal found on its associated request line when enabled;

means for generating timing pulses

binary counter means responsive to said timing pulses for generating a plurality of binary counts each representing the address of one of said remote terminal devices;

decoder means coupled to the output of said binary counter means to output a control signal in response to the generation of each of said binary counts, said decoded means coupled to each of said first gating means to output said control signal to the first gating means whose associated request line is connected to the terminal device having the address which generated the control signal for enabling



said first gating means to output an exchange request signal when there is a request signal on the request line;

storage means responsive to the outputting of said control signal to store the binary count generated by said counter means, said storing means connected to said microprocessor;

disabling means responsive to the outputting of said exchange request signal for disabling said counter means and operating said storing means to transfer the binary count stored therein to the microprocessor;

and means responsive to the transfer of the binary count to the microprocessor to initiate the transfer of information from the requesting terminal device to the microprocessor for storage therein.

4,177,516

ELECTRONIC DIGITAL GOVERNOR

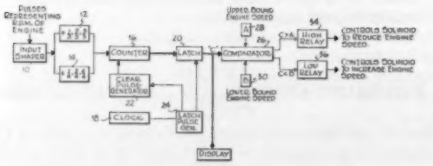
Ralph I. Mason, Calgary, Canada, assignor to Shaw GMC Trucks Ltd., Calgary, Canada

Filed Jan. 16, 1978, Ser. No. 869,766

Claims priority, application Canada, Feb. 15, 1977, 271857

Int. Cl.[2] G06F *15/20*; F02D *31/00*

U.S. Cl. 364—431 **14 Claims**



1. An electronic digital governor for controlling the RPM of an engine comprising:

(a) clock generator means including a clear pulse generator and a latch pulse generator;

(b) a sensor for receiving a train of pulses whose number per unit time is proportional to the RPM of said engine;

(c) counting means connected to said sensor means for counting the number of pulses in said train of pulses, said count being carried out between consecutive clear pulses fed to said counter by said clear pulse generator;

(d) latch means connected to said counting means, for storing a count accumulated between consecutive clear pulses, said latch being controlled by latch pulses from said latch pulse generator, the time duration between consecutive clear pulses and consecutive latch pulses being the same and equal to a predetermined time period T;

(e) comparator means having a first input connected to said latch and a second input connected to a switch means which is manually controllable to enter an upper bound RPM value, wherein said comparator means compares said stored count with said upper bound RPM value and activates a relay if said stored value is greater than said upper bound RPM value; and

(f) an electromechanical device, controllable by said relay for controlling the RPM of said engine to reduce the RPM below said upper bound RPM value.

4,177,517

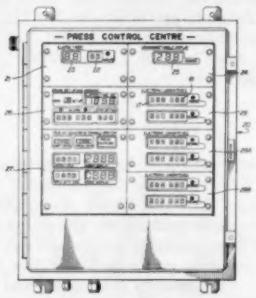
MONITORING DEVICE FOR POWER PRESSES

Klaus H. Mette, 2412 Cavendish Dr., Burlington, Ontario, and Andrew R. St. Denis, 3541 Rankin, Windsor, Ontario, both of Canada

Continuation-in-part of Ser. No. 703,226, Jul. 7, 1976, Pat. No. 4,057,713. This application Oct. 20, 1977, Ser. No. 844,130

Int. Cl.[2] G01C *1/00*; G01P *3/36*

U.S. Cl. 364—559 **7 Claims**



1. A monitoring device for use with a rotary drive shaft of machine tools, comprising a light emitting means and a photoelectric receiving means for producing a discrete electrical signal for each rotation of the driveshaft through a selected fractional part of one rotation of the shaft, a data process for receiving said electric signals and converting said signals to rotational positions of said shaft in degrees, a digital display adapted to indicate the output of said data processor in degrees of a circle and electronic switches adjustable in degrees indicative of the angular position of the drive shaft and being adapted to control operational functions associated with the machine tool at precise locations in each revolution of the shaft as indicated by the output of the data processor.

4,177,518

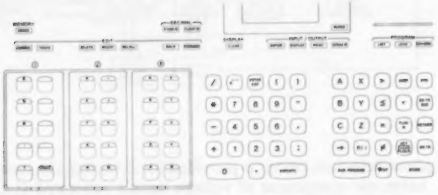
PROGRAMMABLE CALCULATOR INCLUDING SCROLLING ALPHANUMERIC DISPLAY MEANS

Emil E. Olander, Jr., Fort Collins; Rex L. James, Loveland; Ivar W. Larson, Loveland; Wayne F. Covington, Loveland; Jack M. Walden, Loveland; Robert E. Watson, Loveland; Francis J. Yockey, Loveland; Fred Wenninger, Jr., Loveland, and Homer C. Russell, Berthoud, all of Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Division of Ser. No. 510,921, Sep. 30, 1974, Pat. No. 4,028,538, which is a division of Ser. No. 212,581, Dec. 27, 1971, Pat. No. 3,839,630. This application Jun. 1, 1977, Ser. No. 802,303

Int. Cl.[2] G06F *3/14*

U.S. Cl. 364—710 **4 Claims**



1. An electronic calculator comprising:

keyboard input means having a plurality of keys for entering one or more lines of alphameric information, including a display command, into the calculator, said keyboard input means including keys representative of every alphabetic character of a selected language, every numeric character from zero through nine, and a plurality of special characters;

memory means for storing each line of alphameric information as it is being entered into the calculator from said keyboard input means and for storing a program comprising a plurality of lines of alphameric information entered into the calculator, said memory means including a plurality of data storage registers for storing data;

processing means, coupled to said keyboard input means and memory means, for selectively processing a single line of alphameric information entered into the calculator and a program previously stored in said memory means to perform selected functions and to compute the results of selected algebraic expressions; and

display means, coupled to said processing means, for providing a visual indication of each line of alphameric information entered into the calculator and of the results of selected functions and algebraic expressions processed by said processing means, said display means being operative for visually displaying any selected one or more of the alphabetic, numeric, and special characters represented by the keys of said keyboard input means;

said processing means being responsive to a display command, including specification of one or more of said data storage registers, that is encountered during processing of a line of alphameric information stored in said memory means for causing the contents of the specified one or more data storage registers to be displayed by said display means without thereby altering the contents of those specified data storage registers.

4,177,519

ELECTRONIC CONTROL ASSEMBLY MOUNTED ON A FLEXIBLE CARRIER AND MANUFACTURE THEREOF

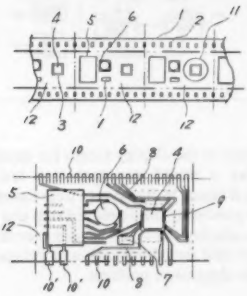
Takeshi Kasubuchi, Nara; Kaoru Ozawa, Yamatokoriyama, and Takeo Hara, Ikoma, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 709,518, Jul. 28, 1976, abandoned. This application Apr. 17, 1978, Ser. No. 897,116

Claims priority, application Japan, Jul. 28, 1975, 50-92302

Int. Cl.[2] H05K *3/30*

U.S. Cl. 364—712 **11 Claims**



1. An electronic network for interconnecting a display means, battery and key input means into an operative combination, comprising:

a flexible carrier film having physical characteristics on the order of 35 mm motion picture film; wiring patterns formed directly on the flexible carrier film;

a semiconductor chip mounted on the flexible carrier film through the use of multibonding technique;

a power supply circuit element mounted on the flexible carrier film;

connection lead means formed on both sides of the flexible carrier film;

said connection lead means on one side of flexible carrier film being for connection to a said display means external to said carrier film; and

said connection lead means on the remaining side of said flexible carrier film being for connection to at least a said key input means external to said carrier film.

4,177,520

CALCULATOR APPARATUS HAVING A SINGLE-STEP KEY FOR DISPLAYING AND EXECUTING PROGRAM STEPS AND DISPLAYING THE RESULT

Randall B. Neff, Menlo Park, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Aug. 14, 1975, Ser. No. 604,696

Int. Cl.[2] G06F *3/14*

U.S. Cl. 364—900 **9 Claims**

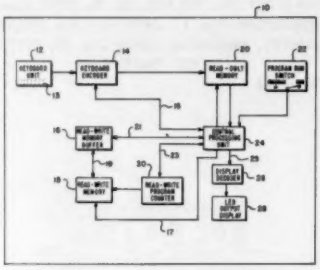
1. A programmable calculator for storing and executing a program having a plurality of program steps, said calculator comprising:

keyboard means having a keyboard unit with a plurality of keys for entering data and program steps including a single-step key for initiating single-step operations and having means for generating a signal indicative of said single-step key being depressed and for terminating the generation of said signal, the terminating being indicative of said single-step key being released from it depressed position;

storage means coupled to said keyboard means for receiving and storing entered program steps;

display means for displaying stored program steps, step numbers, and results of executions of said steps; and

processing means coupled to the keyboard means, to the storage means, and to the display means for causing the display means to display a stored program step and step number responsive to said signal indicative of depression of the single-step key, and for executing the displayed step and for causing the display means to display the result of said execution in response to the absence of said signal indicative of release of the single-step key from its depressed position.



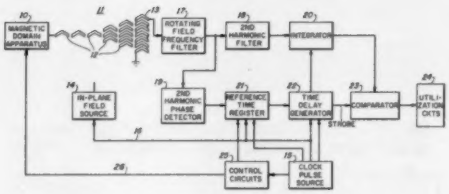
4,177,521

OUTPUT TIMING ARRANGEMENT FOR SINGLE-WALL MAGNETIC DOMAIN APPARATUS

Edwin M. Schaefer, III, North Aurora, Ill., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 27, 1978, Ser. No. 890,662
Int. Cl.[2] G11C *19/08*
U.S. Cl. 365—8 7 Claims

1. A readout timing arrangement for single-wall magnetic domain apparatus comprising magnetic media in which single-wall magnetic domains may be created and propagated, means for generating an in-plane magnetic rotating field for propagating said domains, and a domain detector array, characterized in that



a phase detection circuit is provided for detecting the second harmonic component of voltage signals generated at said detector array by said propagating field for generating phase angle signals and being further characterized in circuit means operated responsive to said phase angle signals for generating strobe signals for detecting domain-generated output signals at said detector array.

DESIGN PATENTS

GRANTED DEC. 4, 1979

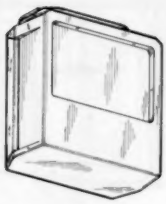
ERRATA

For CLASS	See PATENT NO.
D09–071	253,561
D21–054	253,615

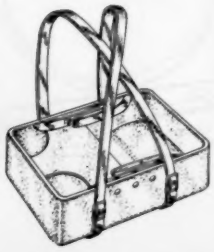
DESIGNS

DECEMBER 4, 1979

253,556
CARRYING CASE FOR PARAMEDIC EQUIPMENT OR THE LIKE
Herbert F. D'Alo, Lakewood, Ill., assignor to Abbott Laboratories, North Chicago, Ill.
Filed Feb. 10, 1978, Ser. No. 876,775
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D3—30



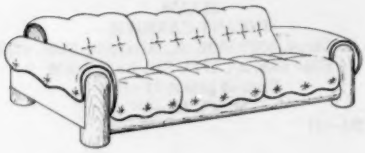
253,557
INFANT CARRIER
Debbie A. Thompson, 1439 Cerro Verde, San Jose, Calif. 95120
Filed Dec. 1, 1977, Ser. No. 856,607
Term of patent 14 years
Int. Cl. D3—*99*
U.S. Cl. D3—31



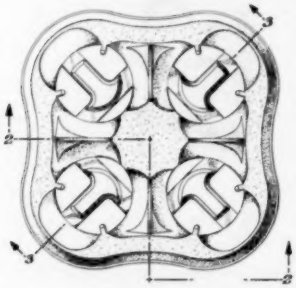
253,558
INFANT CARRIER
Kathleen T. Carter, 4307 Fifth St., Riverside, Calif. 92501
Filed Dec. 27, 1977, Ser. No. 864,659
Term of patent 14 years
Int. Cl. D3—*99*
U.S. Cl. D3—31

253,559
CHAIR
Morris F. Fisher, North Palm Beach, Fla., assignor to Futorian Corporation, Amsterdam, N.Y.
Filed Oct. 11, 1977, Ser. No. 840,691
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—57

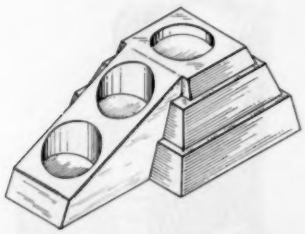
253,560
UPHOLSTERED SOFA
Lester Beall, Jr., High Point, N.C., assignor to The Bean Station Furniture Factory, Bean Station, Tenn.
Filed Nov. 29, 1977, Ser. No. 855,759
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—63



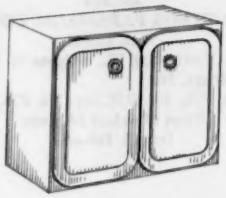
253,561
BEVERAGE TRAY
Henry R. Vigue, Waterville, Me., assignor to Keyes Fibre Company
Filed Mar. 25, 1977, Ser. No. 781,135
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D7—71



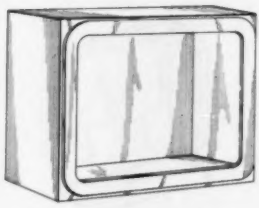
253,562
VERTICAL HEIGHT ADJUSTING STAND FOR A BED
Peter K. Evans, 420 LeJeune Rd., N., Miami, Fla. 33126
Filed Jun. 6, 1977, Ser. No. 804,109
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—85



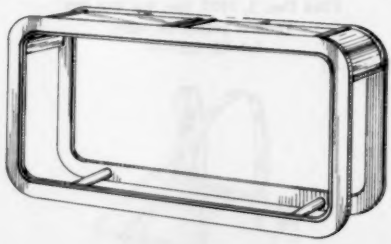
253,563
CABINET
Nicholas A. Ungaro, Louisville, Ky., assignor to Peters-Revington Corporation, Amsterdam, N.Y.
Filed Aug. 8, 1977, Ser. No. 822,484
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—127



253,564
CABINET
Nicholas A. Ungaro, Louisville, Ky., assignor to Peters-Revington Corporation, Amsterdam, N.Y.
Filed Aug. 10, 1977, Ser. No. 823,294
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—130



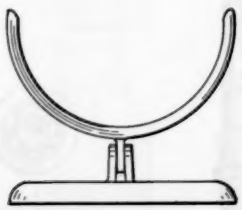
253,565
TABLE
Nicholas A. Ungaro, Louisville, Ky., assignor to Peters-Revington Corporation, Amsterdam, N.Y.
Filed Aug. 10, 1977, Ser. No. 823,291
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—175



253,566
SPEAKER STAND
Larry K. Davis, 1701 S. Florence, Tulsa, Okla. 74104
Filed Oct. 28, 1977, Ser. No. 846,391
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—184

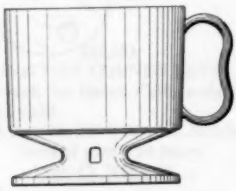
253,567
CABINET
Nicholas A. Ungaro, Louisville, Ky., assignor to Peters-Revington Corporation, Amsterdam, N.Y.
Filed Aug. 11, 1977, Ser. No. 823,814
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—189

253,568
ARM REST
Anne M. Brink, 12561 Shelley Dr., Apt. 5, Garden Grove, Calif. 92640
Filed Oct. 4, 1977, Ser. No. 839,275
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—191



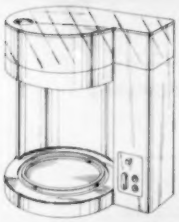
253,569
PUNCH BOWL OR THE LIKE
Alvin Gruber, 2215 Disston St., Philadelphia, Pa. 19149
Filed Aug. 24, 1977, Ser. No. 827,140
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—4

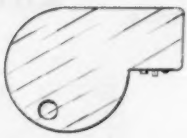
253,570
DRINKING CUP
James F. Pomroy, St. Paul, Minn., assignor to Plastics, Inc., St. Paul, Minn.
Filed Oct. 13, 1977, Ser. No. 841,690
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—9



253,571
DRINKING GLASS OR SIMILAR ARTICLE
Mark R. Schreibman, and James V. Park, both of 4325 Comanche Dr., #1, Boulder, Colo. 80303
Filed Nov. 7, 1977, Ser. No. 849,228
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—13

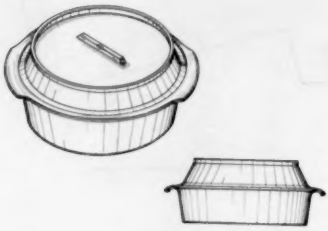
253,572
COFFEEMAKER
Joseph A. Rinaldi, Oradell, N.J., assignor to Rival Manufacturing Company, Kansas City, Mo.
Filed Jun. 24, 1977, Ser. No. 809,639
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—41



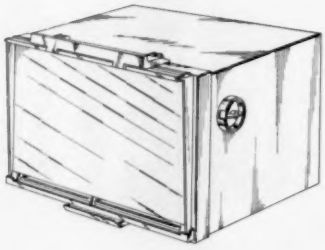


253,573
COMBINED LADLE AND COVERED GRAVY BOAT
William R. Edwards, Box 40, Rte. 2, California, Md. 20619
Filed Mar. 30, 1977, Ser. No. 782,838
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—65

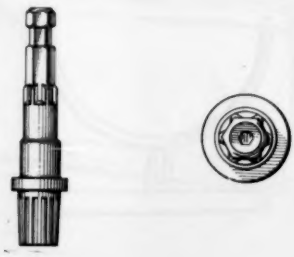
253,574
CASSEROLE WITH COVER SEPARATELY USABLE AS PIE PLATE OR THE LIKE
William M. Anderson, Jr., Lynnwood, Wash., assignor to AMG Industries, Inc., Seattle, Wash.
Filed Aug. 5, 1977, Ser. No. 821,982
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—97



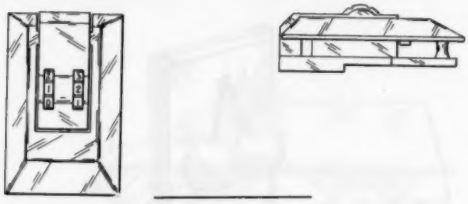
253,575
COOKING AND DEHYDRATING DEVICE
Robert J. Scott, Blue Springs, and Bill G. Mead, Raytown, both of Mo., assignors to Rival Manufacturing Company, Kansas City, Mo.
Filed Jun. 16, 1977, Ser. No. 807,043
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—128



253,576
SHAFT COUPLING FOR GARDEN IMPLEMENTS AND THE LIKE
Dieter Raffler, and Franco Clivio, both of Ulm, Fed. Rep. of Germany, assignors to Gardena Kress & Kastner GmbH, Fed. Rep. of Germany
Filed Jun. 28, 1977, Ser. No. 810,826
Claims priority, application Fed. Rep. of Germany, Jan. 14, 1977, MR771
Term of patent 14 years
Int. Cl. D8—*01*
U.S. Cl. D8—1



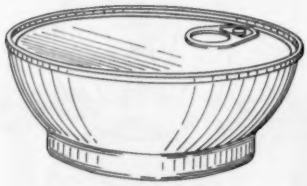
253,577
LUGGAGE ZIPPER LOCK
Wallace E. Atkinson, Petersburg, Va., assignor to United States Luggage Corp.
Filed May 3, 1978, Ser. No. 902,770
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—338



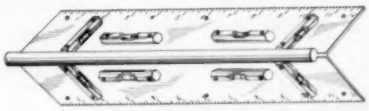
253,578
SPRING CLIP
Stephen E. D. Fournier, 74 Tremont St., Hartford, Conn. 06105
Filed Aug. 24, 1977, Ser. No. 827,388
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—395

253,579
COMBINED BOTTLE AND CAP
Irene Sinclair, London, England, assignor to Lever Brothers Company, New York, N.Y.
Filed Jul. 5, 1977, Ser. No. 813,110
Claims priority, application United Kingdom, Jan. 5, 1977, 978442/77
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—128

253,580
PACKAGING CONTAINER OR THE LIKE
Carmen T. Mascia, Clarendon Hills, Ill., assignor to The Continental Group, Inc., New York, N.Y.
Filed Aug. 15, 1977, Ser. No. 824,367
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—220



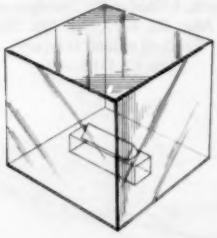
253,581
FOUR WAY CORNER LEVEL
Robert H. Vanderwerf, San Rafael, Calif., assignor to Vy-Dawn, Inc., San Rafael, Calif.
Filed Jun. 30, 1977, Ser. No. 811,538
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—69



253,582
STUD MARKING GUIDE
Thomas M. Schwartz, 4 Garden St., Newburyport, Mass. 01950
Filed Mar. 22, 1977, Ser. No. 780,030
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—70

253,583
CHARM, MEDALLION OR SIMILAR ARTICLE
Charles E. Millican, 11742 Aldine Westfield, Houston, Tex. 77093
Filed Oct. 3, 1977, Ser. No. 838,940
Term of patent 3½ years
Int. Cl. D11—*01*
U.S. Cl. D11—101

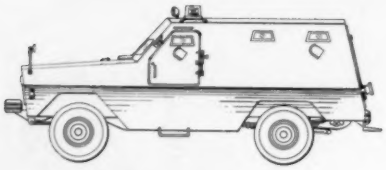
253,584
DESK ORNAMENT
David E. Dorsen, 1506 Oakdale, Chicago, Ill. 60657
Filed Jul. 5, 1977, Ser. No. 813,106
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—131



253,585
PLAQUE
John V. Rawson, Jr., South Plainfield, N.J., assignor to The Brass Ones, Inc., Rocky Hill, N.J.
Filed Feb. 13, 1978, Ser. No. 877,425
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—140

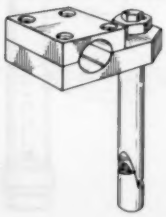
253,586
CONTAINER FOR GROWING EDIBLE SPROUTS FROM SEEDS
Machmud D. Rowe; Robert H. Hetherington, and Susan L. Johnson, all of Seattle, Wash., assignors to Bima Industries, Inc., Seattle, Wash.
Filed Apr. 14, 1978, Ser. No. 896,780
Term of patent 14 years
Int. Cl. D11—*02;* D9—*03*
U.S. Cl. D11—152

253,587
COMMANDO ARMORED TRANSPORTER
James M. Bemiss, St. Clair Shores, Mich., assignor to Ex-Cell-O Corporation, Troy, Mich.
Filed Apr. 27, 1978, Ser. No. 900,463
Term of patent 14 years
Int. Cl. D12—*13*
U.S. Cl. D12—12

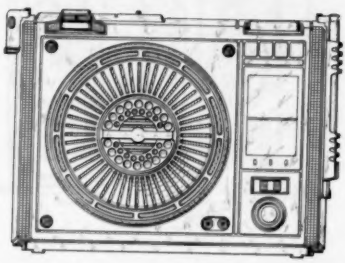


253,588
MOTORCYCLE
Koichiro Ban, Tachikawa; Tsunemi Kawashima, Tokyo, and Kunihiko Kobayashi, Tanashi, all of Japan, assignors to Yamaha Hatsukoki Kabushiki Kaisha, Shizuoka, Japan
Filed Mar. 2, 1978, Ser. No. 883,040
Claims priority, application Japan, Sep. 3, 1977, 52-35129
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—110

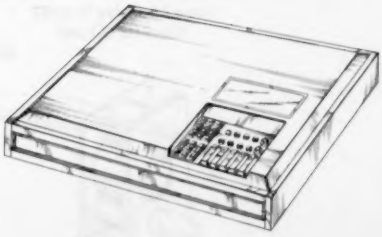
253,589
BICYCLE HANDLEBAR CLAMP
Gary R. Horton, 879 Tierra Alta, Moss Beach, Calif. 94018
Filed Sep. 16, 1977, Ser. No. 834,144
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—118



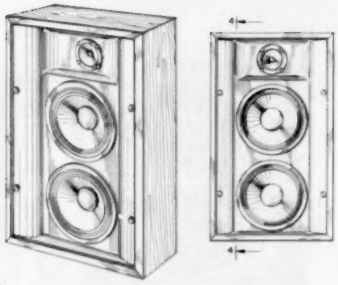
253,590
COMBINED CARTRIDGE PLAYER AND RADIO
Paul J. Kluczník, Manlius, N.Y., assignor to General Electric Company
Filed Jul. 7, 1977, Ser. No. 813,610
Term of patent 14 years
Int. Cl. D14—*01, 03*
U.S. Cl. D14—5



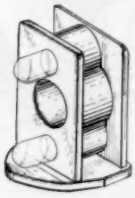
253,591
MICROPROCESSOR-CONTROLLED RADIAL TRACKING RECORD PLAYER
Robert G. Cheeseboro, 3650 Somerset Dr., Los Angeles, Calif. 90016
Filed Mar. 16, 1977, Ser. No. 778,056
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—14



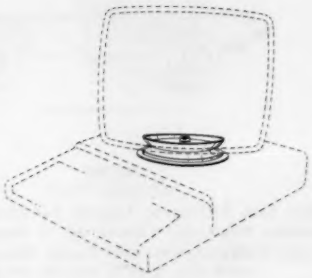
253,592
LOUDSPEAKER
Hideo Takei, Flushing, N.Y., assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Jul. 5, 1977, Ser. No. 813,129
Term of patent 14 years
Int. Cl. D14—*01, 03*
U.S. Cl. D14—34



253,593
LAMP CARTRIDGE FOR OPTICAL CHARACTER RECOGNITION READER
William R. Smith, Mountain View, and Anthony Sun, Los Altos, both of Calif., assignors to Caere Corporation, Mountain View, Calif.
Filed May 27, 1977, Ser. No. 801,293
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—40



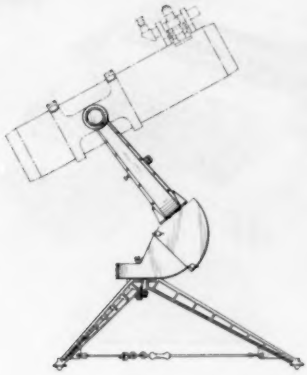
253,594
COMBINED TURN AND TILT BASE
Alan F. Antenbring, Broxbourne, England, assignor to International Standard Electric Corporation
Filed Jun. 13, 1977, Ser. No. 806,254
Term of patent 14 years
Int. Cl. D14—*02;* D6—*06*
U.S. Cl. D14—40

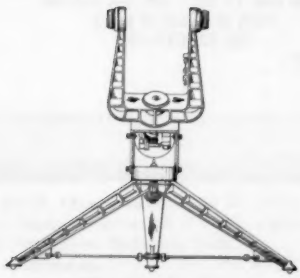


253,595
COMBINED RADIO AND PEN
Hoi T. Vong, 179/180 Connaught Rd. West, Cheung Ka Industrial Bldg., 19th Floor., Block A, West Point, Hong Kong, Hong Kong
Filed Jun. 15, 1977, Ser. No. 806,934
Claims priority, application United Kingdom, Dec. 20, 1976, 978328
Term of patent 14 years
Int. Cl. D14—*03;* D19—*06*
U.S. Cl. D14—69

253,596
SUCTION TOOL FOR A LIQUID DISPENSING VACUUM CLEANER
Jelle G. Nauta, R.R. #4, Stouffville, Ontario, Canada
Filed Oct. 5, 1977, Ser. No. 839,759
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D15—63

253,598
TELESCOPE MOUNT
Peter W. Bressler, Philadelphia, Pa., assignor to Edmund Scientific Company, Barrington, N.J.
Filed Sep. 2, 1977, Ser. No. 830,364
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—60





253,597
TEMPLE FOR SPECTACLES
Charles I. Solomon, Box 12495, San Antonio, Tex. 78215
Filed Aug. 22, 1977, Ser. No. 826,358
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—81

253,599
PAIR OF TEMPLE BARS FOR EYEGLASSES
John P. Bell, Jr., 110 Fairlane Dr., Rochester, N.Y. 14626
Filed May 23, 1978, Ser. No. 908,901
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—81

253,600
TYPEWRITER
Allan L. McCroskery, Weston, Conn., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Mar. 2, 1977, Ser. No. 773,726
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D18—1

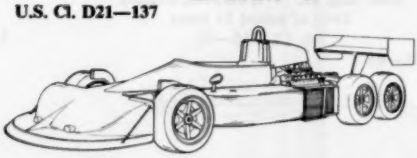
253,601
FINGER-PROTECTIVE CUTTING GUIDE
William J. Weber, Dix Hills; Jeffrey Herbst, Plainview, and Thomas Cullen, Levittown, all of N.Y., assignors to Weber & Stevens, Inc., Melville, N.Y.
Filed Oct. 17, 1977, Ser. No. 843,123
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—37

253,602
TOY GLIDER
Dewayne L. Evans, 3161 Belleview Rd., Toledo, Ohio 43606
Filed May 18, 1977, Ser. No. 798,230
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—89

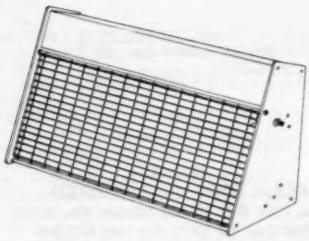
253,603
TOY PARACHUTE FRAME
Sam Kupperman, Chicago, and Dennis Kupperman, Glenview, both of Ill., assignors to RB Toy Development Co., Skokie, Ill.
Filed May 31, 1977, Ser. No. 801,630
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—91

253,604
TOY PARACHUTE FRAME
Sam Kupperman, Chicago, and Dennis Kupperman, Glenview, both of Ill., assignors to RB Toy Development Co., Skokie, Ill.
Filed May 31, 1977, Ser. No. 802,285
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—91

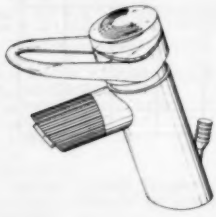
253,605
MODEL RACING CAR
Robert J. Herd, Milton Malsor, England, assignor to March Engineering Limited, Bicester, England
Filed Jun. 2, 1977, Ser. No. 802,829
Claims priority, application United Kingdom, Dec. 2, 1976, 978124/76
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—137



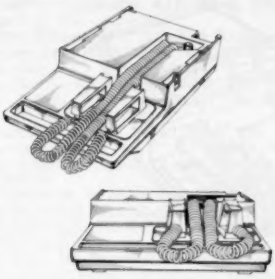
253,606
ELECTRIC INSECT EXTERMINATOR
Mordechai Yavnieli, Tel-Aviv, Israel, assignor to Amcor Ltd., Tel-Aviv, Israel
Filed Aug. 22, 1977, Ser. No. 826,776
Claims priority, application Israel, Mar. 1, 1977, 6680
Term of patent 14 years
Int. Cl. D22—*06*
U.S. Cl. D22—19



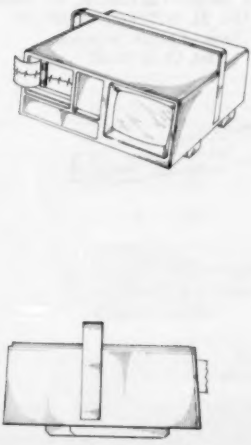
253,607
WATER FAUCET
Andreas Haug, Altensteig, Fed. Rep. of Germany, assignor to Hans Grohe GmbH & Co. KG, Fed. Rep. of Germany
Filed Sep. 8, 1978, Ser. No. 941,331
Claims priority, application Fed. Rep. of Germany, Mar. 9, 1978, MR 934 OB
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—23



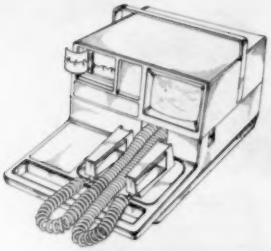
253,608
PORTABLE DEFIBRILLATOR OR THE LIKE
David B. Smith, Mercer Island; Paul W. Jones, Bothell; John M. Moore, Redmond, and William C. Bruton, Seattle, all of Wash., assignors to Physio-Control Corporation, Redmond, Wash.
Filed Sep. 11, 1978, Ser. No. 942,748
Term of patent 14 years
Int. Cl. D24—*01, 02*
U.S. Cl. D24—8



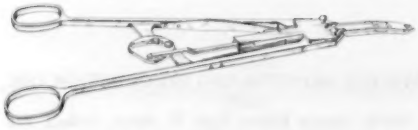
253,609
PORTABLE EKG MONITOR/EKG RECORDER OR THE LIKE
David B. Smith, Mercer Island; Paul W. Jones, Bothell, and James A. Benson, Bellevue, all of Wash., assignors to Physio-Control Corporation, Redmond, Wash.
Filed Sep. 11, 1978, Ser. No. 942,749
Term of patent 14 years
Int. Cl. D24—*01, 02*
U.S. Cl. D24—17



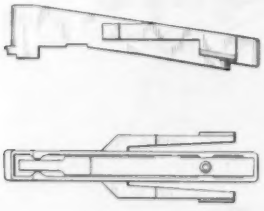
253,610
PORTABLE DEFIBRILLATOR/EKG MONITOR/EKG RECORDER OR THE LIKE
David B. Smith, Mercer Island; Paul W. Jones, Bothell; James A. Benson, Bellevue; John M. Moore, Redmond, and William C. Bruton, Seattle, all of Wash., assignors to Physio-Control Corporation, Redmond, Wash.
Filed Sep. 11, 1978, Ser. No. 942,750
Term of patent 14 years
Int. Cl. D24—*01, 02*
U.S. Cl. D24—17



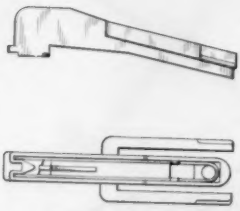
253,611
SURGICAL CLIP APPLIER
Robert K. Jarvik, Salt Lake City, Utah, and Stephen J. Jewusiak, Denville, N.J., assignors to Ethicon, Inc., Somerville, N.J.
Filed Oct. 31, 1977, Ser. No. 847,384
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—26



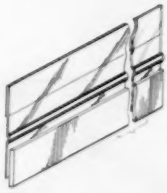
253,612
SURGICAL CLIP CARTRIDGE
Robert K. Jarvik, Salt Lake City, Utah, and Robert W. Mericle, Bridgewater, N.J., assignors to Ethicon, Inc., Somerville, N.J.
Filed Oct. 31, 1977, Ser. No. 847,387
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—27



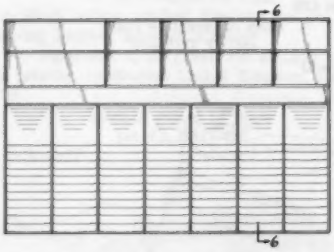
253,613
SURGICAL CLIP CARTRIDGE
Robert K. Jarvik, Salt Lake City, Utah, and Robert W. Mericle, Bridgewater, N.J., assignors to Ethicon, Inc., Somerville, N.J.
Filed Oct. 31, 1977, Ser. No. 847,388
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—27



253,614
DOOR EDGE DRAFT SHIELD
Bernard Corbin, P.O. Box 29663, Atlanta, Ga. 30359
Filed Jun. 13, 1977, Ser. No. 805,805
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—74



253,615
PLAYING CARD HOLDER
Walter R. Colwell, 2725 Via Arboleda, San Clemente, Calif. 92672
Filed Jun. 20, 1977, Ser. No. 807,980
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—54



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 4TH DAY OF DECEMBER, 1979

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A-T-O Inc.: *See*—
Vorkapich, Theodore, 4,176,718, Cl. 169-39.000.

AB Bofors: *See*—
Albrektsson, Kjell A.; Eriksson, Bertil T.; Eriksson, Sven W.; Franzen, Hans A. E.; and Sandlin, Rolf H., 4,176,814, Cl. 244-3.150.

AB Volvo: *See*—
Otteblad, Sven I. A.; Brynielsson, Erner T. O.; Dovertie, Ralph G.; Franzen, Stig E. R.; and Brelen, Hans E. O., 4,176,728, Cl. 180-168.000.

Abbott, Sheldon J. Dental drill. 4,176,453, Cl. 433-82.000.

Ackley, Daniel: *See*—
Siu, Ting Y.; and Ackley, Daniel, 4,177,151, Cl. 252-8.600.

Acro Matic Inc.: *See*—
Terpening, George I., 4,176,665, Cl. 128-165.000.

Acurex Corporation: *See*—
Kennedy, William S., 4,177,083, Cl. 136-89.0CA.

Adams, Alphonso, to Adams, Helen H., a part interest. Template for supporting a door frame. 4,176,831, Cl. 269-17.000.

Adams, Clyde M., Jr. Method and apparatus for separation, refinement, extraction and/or concentration by liquation. 4,177,051, Cl. 62-532.000.

Adams, Helen H.: *See*—
Adams, Alphonso, 4,176,831, Cl. 269-17.000.

Adams, Richard L., to General Motors Corporation. Precoagulated PTFE-bound electrodes. 4,177,157, Cl. 252-182.100.

Adjemian, Alain: *See*—
Cohen, Joseph; and Adjemian, Alain, 4,177,242, Cl. 423-83.000.

Adult Care Products, Inc.: *See*—
Herring, Julian N., 4,176,667, Cl. 128-287.000.

Advent Corporation: *See*—
Hergenrother, George R.; and Sprague, Peter J., 4,177,400, Cl. 313-477.00R.

Ag Best Corporation: *See*—
Gilst, Carl V., 4,176,869, Cl. 292-304.000.

Agar International Ltd.: *See*—
Boje, Daniel Q., 4,177,484, Cl. 358-254.000.

Agence Nationale de Valorisation de la Recherche (A.N.V.A.R.): *See*—
Deficis, Alain; Gimonet, Marie-Edith; Priou, Alain; and Fournet-Fayas, Christian, 4,177,422, Cl. 324-95.000.

Agfa-Gevaert AG: *See*—
Weiss, Rudolf; Kiessling, Werner; and Wiedemann, Otto, 4,176,938, Cl. 354-275.000.

Agfa-Gevaert Aktiengesellschaft: *See*—
Eickel, Rolf; and Rheude, Alfred, 4,177,380, Cl. 250-315.200.
Knor, Bernhard; Payrhammer, Bernd; and Treiber, Helmut, 4,176,964, Cl. 356-444.000.
Lermann, Peter; and Fauth, Gunter, 4,176,934, Cl. 354-150.000.
Leuchter, Jurgen, 4,176,939, Cl. 354-307.000.
Payrhammer, Bernd, 4,176,944, Cl. 355-18.000.
Wagensonner, Eduard, 4,176,927, Cl. 354-21.000.

Agfa-Gevaert, N.V.: *See*—
De Brabandere, Luc A.; Borginon, Hendrik A.; Pattyn, Herman A.; and Pollet, Robert J., 4,177,071, Cl. 430-494.000.

Ahlen, Karl G.; Bergstrom, Per-Olof; and Supanich, Joseph, to S.R.M. Hydromekanik Aktiebolg. Control arrangement for variable power transmission. 4,176,564, Cl. 74-732.000.

Ahlschlager, Christ L.; Ahlschlager, Marvin L.; and Ahlschlager, Donald A. Firewood splitting device. 4,176,698, Cl. 144-193.00R.

Ahlschlager, Donald A.: *See*—
Ahlschlager, Christ L.; Ahlschlager, Marvin L.; and Ahlschlager, Donald A., 4,176,698, Cl. 144-193.00R.

Ahlschlager, Marvin L.: *See*—
Ahlschlager, Christ L.; Ahlschlager, Marvin L.; and Ahlschlager, Donald A., 4,176,698, Cl. 144-193.00R.

Aho, Leo E., to Sarvis Oy. Stackable crates. 4,176,747, Cl. 206-509.000.

Airco, Inc.: *See*—
Wittenrich, John H., 4,176,998, Cl. 414-433.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Yamanaka, Minoru; and Ii, Akira, 4,177,224, Cl. 261-39.00A.

AIT Industries, Inc.: *See*—
Vulich, Yordan; and Loreto, Wilfredo P., 4,176,498, Cl. 51-101.0LG.

Aizawa, Hiroshi: *See*—
Kozuki, Susumu; Uchidoi, Masanori; Date, Nobuaki; Shimizu, Masami; Aizawa, Hiroshi; and Takishima, Yoshiyuki, 4,176,936, Cl. 354-38.000.

Ajax Hardware Corporation: *See*—
Gorton, Howard B., 4,176,890, Cl. 312-343.000.

Akai, Norio; Inoue, Nobumasa; and Ohtani, Kazuo. Device for preventing slipping of turntable out of shaft. 4,176,847, Cl. 274-39.00R.

Akkerboom, Piet J.; Lower, Geertruiida J.; and Timp, Willem J., to Gist-Brocades N.V. Process for the preparation of hydroxyphosphinylureidobenzylpenicillins. 4,177,189, Cl. 260-239.100.

Aktiebolaget Leo: *See*—
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Akzona Inc.: *See*—
Franks, Neal E., 4,177,236, Cl. 264-187.000.
Rasen, Alfred; Vollbrecht, Rolf; and Schenesse, Klemens, 4,177,312, Cl. 428-284.000.
Smakman, Robert, 4,177,140, Cl. 210-37.00R.
van der Burg, Willem J., 4,177,275, Cl. 424-256.000.
Zeelen, Filippus J.; and Groen, Marinus B., 4,177,197, Cl. 260-397.500.

Albanese, Vincent M., to Nalco Chemical Company. Chemical treatment for improving electrostatic precipitation of dust particles in electrostatic precipitators. 4,177,043, Cl. 55-5.000.

Albrecht, Wolfgang: *See*—
Selden, Peter H.; Duerkop, Joachim; Albrecht, Wolfgang; and Weissenmayer, Heinz, 4,177,032, Cl. 425-468.000.

Albrektsson, Kjell A.; Eriksson, Bertil T.; Eriksson, Sven W.; Franzen, Hans A. E.; and Sandlin, Rolf H., to AB Bofors. Terminally corrected projectile. 4,176,814, Cl. 244-3.150.

Aldridge, Lionel D., to Burroughs Corporation. High density double contacting connector assembly for leadless integrated circuit packages. 4,176,895, Cl. 339-17.0CF.

Alfa-Laval AB: *See*—
Jernqvist, Ake S., 4,177,044, Cl. 55-48.000.

Alfa Romeo S.p.A.: *See*—
Bassi, Aldo, 4,176,627, Cl. 123-32.0EB.

Alfranseder, Josef: *See*—
Rebsdat, Siegfried; Mayer, Sigmund; Alfranseder, Josef; and Riedl, Josef, 4,177,169, Cl. 252-476.000.

Alkema, Jan, to Koninklijke Adriaan Volker Baggermaatschappij B.V. Hopper vessel with discharge valve members adapted to selectively function as part of a discharge conduit. 4,176,885, Cl. 406-128.000.

All Phase Electronics, Inc.: *See*—
Brown, David A.; Norman, Jan L.; and Whitson, Donald W., 4,177,461, Cl. 340-628.000.

Allard, John J.; and Montz, James R., to AMF Incorporated. Automatic temperature controller with night setback and operating as a function of outside air. 4,176,785, Cl. 236-46.00R.

Allen D. Everitt Knitting Company: *See*—
Everitt, Allen D., 4,176,409, Cl. 2-173.000.

Allen, Dillis V. Electric transportation system. 4,176,609, Cl. 104-88.000.

Allen, Paul E., to Logic Devices, Inc. Fluid cooling of injection molded plastic articles. 4,177,238, Cl. 264-328.000.

Allenbaugh, George G., Jr., to Premier Industrial Corporation. Liquid particle deflector structure for discharge nozzles. 4,176,794, Cl. 239-498.000.

Allert, Anton; Weiss, Friedrich; and Schrape, Peter, to Daimler-Benz Aktiengesellschaft. Anti-skid protective cap especially of rubber, for actuating pedals of a motor vehicle. 4,176,562, Cl. 74-563.000.

Allied Chemical Corporation: *See*—
Seven, Manfred K.; and Olearczyk, Francis J., deceased (said Manfred K. Seven assors. to), 4,177,336, Cl. 525-325.000.

Alpers, Gunther; and Bentz, Helmut, to O&K Orenstein & Koppel Aktiengesellschaft. Endless track traveling mechanism. 4,176,887, Cl. 305-57.000.

Alsthom-Atlantique: *See*—
Danel, Francois, 4,177,226, Cl. 261-124.000.
Senes, Albert, 4,177,478, Cl. 357-38.000.

Altec Corporation: *See*—
Sinclair, Rex, 4,176,731, Cl. 181-192.000.

Aluminum Pechiney: *See*—
Cohen, Joseph; and Adjemian, Alain, 4,177,242, Cl. 423-83.000.

ALZA Corporation: *See*—
Michaels, Alan S.; and Guillod, Mark S., 4,177,256, Cl. 424-22.000.

Amana Refrigeration, Inc.: *See*—
Fritts, Rex E., 4,177,369, Cl. 219-10.55B.

Ambros, Otto: *See*—
Schoenafinger, Eduard; Deigner, Paul; Koester, Eberhard; Ohlinger, Manfred; Schaefer, Dieter; Stumpfi, Werner; Amort, Juergen; Seiler, Claus-Dietrich; Nestler, Heinz; and Ambros, Otto, 4,177,317, Cl. 428-405.000.

Ambrosini, Leonard R.; Juliano, Joseph O.; and Rarick, Charles H., to United States of America, Army. Electrically energized impact detonated projectile with safety device. 4,176,608, Cl. 102-216.000.

Amchem Products, Inc.: *See*—
Hall, Wilbur S., 4,177,180, Cl. 260-29.70H.

Amerace Corporation: *See—*
Obuch, Edward A., 4,176,904, Cl. 339-192.00R.

American Cyanamid Company: *See—*
Conrow, Ransom B.; and Bernstein, Seymour, 4,177,209, Cl. 260-506.000.

AMF Incorporated: *See—*
Allard, John J.; and Montz, James R., 4,176,785, Cl. 236-46.00R.
Fiore, Joseph V.; and Slanski, John M., 4,176,668, Cl. 131-17.00A.
Seiling, Samuel O., 4,177,030, Cl. 425-238.000.
Tirone, Stephen A.; and Arthur, Ronald H., 4,177,367, Cl. 200-159.00A.

Amick, David R., to Rohm and Haas Company. Sulfone-crosslinked polystyrene ion exchange resin and process of manufacture. 4,177,331, Cl. 521-33.000.

Amort, Juergen: *See—*
Schoenafinger, Eduard; Deigner, Paul; Koester, Eberhard; Ohlinger, Manfred; Schaefer, Dieter; Stumpfi, Werner; Amort, Juergen; Seiler, Claus-Dietrich; Nestler, Heinz; and Ambros, Otto, 4,177,317, Cl. 428-405.000.

AMP Incorporated: *See—*
Lill, John F., 4,177,397, Cl. 310-71.000.

Ampex Corporation: *See—*
Borzak, Robert A., 4,176,744, Cl. 206-303.000.

Amstad, John H., to Atlas Pacific Engineering Company. Live knife assembly. 4,176,594, Cl. 99-593.000.

Amtel, Inc.: *See—*
Reid, William R.; and Vitale, John, 4,176,615, Cl. 114-230.000.

Andermo, Ingvar, to Stiftelsen Institutet for Mikrovagsteknik vid Tekniska Hogskolan I Stockholm. Method and device for measuring the velocity of an object relative to a reference. 4,177,463, Cl. 343-8.000.

Anderson, Aelita, administrator: *See—*
Anderson, Harald, deceased; Anderson, Aelita, administrator; and Cozine, Michael S., administrator, 4,177,037, Cl. 8-149.000.

Anderson, Clay H.; and St. Jean, Gerard, to C. H. Anderson and Associates Ltd. Winch drum mounted directly on a worm gear drive unit. 4,176,827, Cl. 254-186.00R.

Anderson, Harald, deceased; Anderson, Aelita, administrator; and Cozine, Michael S., administrator. Method for multicolor dyeing of textile yarns. 4,177,037, Cl. 8-149.000.

Anderson, Harvey G.; and Pannaci, Karl E. Selvage strip lifting device. 4,176,430, Cl. 26-96.000.

Anderson, Rodney L., to Creative Tool Specialties, Inc. Universal panograph pattern. 4,176,585, Cl. 409-125.000.

Ando, Wataru; and Watanabe, Kazuo, to K. K. Pollution Preventing Research Laboratory. Method of producing N-formylamine. 4,177,121, Cl. 204-158.00R.

Andros Incorporated: *See—*
McClatchie, Edward A.; Watson, Dean A.; and Burough, Irvin G., 4,177,381, Cl. 250-343.000.

Angstrohm Precision, Inc.: *See—*
Solow, Benjamin, 4,176,445, Cl. 29-620.000.

Anquetin, Jacques L. V. Device for locating and retrieving metallic parts from difficult to reach areas. 4,177,503, Cl. 362-236.000.

Ansul Company, The: *See—*
Rasheed, Khalid; and Warkentin, James D., 4,177,270, Cl. 424-248.510.

Antenore, Ronald L.: *See—*
Capra, Nicholas G.; and Antenore, Ronald L., 4,176,764, Cl. 222-135.000.

Antipenko, Grigory I.: *See—*
Krupman, Leonid I.; Yaroslavtsev, Jury G.; Sochnev, Alexandr E.; Shamil, Jury P.; Khitrik, Abram I.; Antipenko, Grigory I.; Smetanin, Jury G.; Samsonov, Albert N.; Ljudkovsky, Vadim M.; Pokrass, Leonid M.; Kurdjukov, Anatoly A.; Ofengenden, Abram M.; and Zhitnik, Georgy G., 4,177,070, Cl. 75-257.000.

Antonucci, Ermen S.; Cadden, Duane L.; Regenbrecht, Albert; and Schwartz, Edward, to GTE Sylvania Incorporated. Salvage method for cathode ray tubes. 4,176,891, Cl. 316-2.000.

Antos, George J., to UOP Inc. Dehydrogenation process utilizing multimetallic catalytic composite. 4,177,218, Cl. 585-379.000.

Apparatebau Gauting GmbH: *See—*
Borberg, Hartmut, 4,176,672, Cl. 137-99.000.

Appell, Marc; Lepicard, Georges; de Rivet, Philippe-Hubert; Bradley, John J.; and Franklin, Benjamin S., to Compagnie Internationale pour l'Informatique, CII Honeywell Bull. Protection of data in an information multiprocessing system by implementing a concept of rings to represent the different levels of privileges among processes. 4,177,510, Cl. 364-200.000.

Arcamonte, Lucy M. Footwear constructed from a single piece of material. 4,176,475, Cl. 36-9.00R.

Arceneaux, Leonce, to DTL, Incorporated. Diamond drill bit. 4,176,723, Cl. 175-329.000.

Archer, Jean F., to Stas Societe Technique d'Accessoires Specialises. Lifting rings for chain slings. 4,176,874, Cl. 294-78.00A.

Archibald, John L.; and Jackson, John L., to John Wyeth & Brother Ltd. 1-[(3-Indolyl)-alkyl]-piperidyl ureas and hypotensive compositions. 4,177,279, Cl. 424-267.000.

Arhart, Richard J.; and Nersasian, Arthur, to Du Pont de Nemours, E. I., and Company. Press-curable fluoropolymer compositions and process. 4,177,223, Cl. 525-331.000.

Armco Steel Corporation: *See—*
Felton, Dale D.; and Jones, William R., 4,176,865, Cl. 285-373.000.

Armstrong, Rolfe D.; and Gillow, George B., to NCR Corporation. Electrically configurable high-low decoder. 4,177,455, Cl. 340-347.0DD.

Arndt, Friedrich; Kruger, Hans-Rudolf; and Rusch, Reinhart, to Schering Aktiengesellschaft. 1,2,3-Thiadiazole-5-carboxylic acid derivatives, herbicidal and growth regulating compositions containing the same and process for making same. 4,177,054, Cl. 71-90.000.

Arnold Engineering Company, The: *See—*
Bankson, Billye, 4,177,089, Cl. 148-31.550.

Artamonov, Viktor L.: *See—*
Paton, Boris E.; Medovar, Boris I.; Tsukanov, Georgy E.; Bogachenko, Alexei G.; Artamonov, Viktor L.; Timashov, Grigory A.; Shtanko, Jury P.; Marchenko, Alexandr M.; Fedorovsky, Boris B.; Kumysh, Ilya I.; Chepurnoi, Anatoly D.; Saenko, Vladimir Y.; and Semin-Vadov, Gennady M., 4,177,058, Cl. 75-10.00C.

Arthur, Ronald H.: *See—*
Tirone, Stephen A.; and Arthur, Ronald H., 4,177,367, Cl. 200-159.00A.

Arundale, Inc.: *See—*
Corkery, Gregory O., 4,176,816, Cl. 248-188.900.

Arvey Corporation: *See—*
Kooi, Edward, 4,176,746, Cl. 206-438.000.

Asahi-Dow Limited: *See—*
Tsurumi, Michio; Sakakiyama, Takashi; Tazaki, Kichiya; and Koyama, Masaoki, 4,177,181, Cl. 260-29.70H.

Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
Inoue, Akio; Kobayashi, Tadahiro; and Iwasa, Toshio, 4,177,150, Cl. 210-500.00M.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
Nakamura, Kazuo; and Jyojiki, Masao, 4,176,928, Cl. 354-25.000.

Asari, Susumu: *See—*
Kozuka, Kazuhiro; Yamamoto, Shin; Huruhashi, Mikio; Iwaki, Katsutaro; and Asari, Susumu, 4,177,366, Cl. 200-19.0DR.

Ascoli, Enzo, to Gillette Company, The. Battery chargers. 4,177,413, Cl. 320-2.000.

ASEA Aktiebolag: *See—*
Stenkvist, Sven-Einar; and Widell, Bjorn, 4,177,061, Cl. 75-11.000.

Ashby, Bruce A.: *See—*
Razzano, John S.; Petersen, Louis P.; and Ashby, Bruce A., 4,177,200, Cl. 260-448.20N.

Associated Engineering Limited: *See—*
Noddings, John; and Cox, Michael D., 4,177,492, Cl. 361-31.000.

Astra Lakemedel Aktiebolag: *See—*
Lindberg, Ulf H. A.; Ross, Svante B.; Thorberg, Seth O.; and Ogren, Sven O., 4,177,291, Cl. 424-330.000.

Atlantic Richfield Company: *See—*
Wilson, William N., 4,176,720, Cl. 166-293.000.

Atlas Pacific Engineering Company: *See—*
Amstad, John H., 4,176,594, Cl. 99-593.000.

ATO Chemie: *See—*
Boy, Aristide; Galy, Henri; Ivaldi, Raoul; and Passedroit, Hubert, 4,177,208, Cl. 260-504.00S.

Aubard, Gilbert G.: *See—*
Torossian, Dieran R.; Aubard, Gilbert G.; and Legeai, Jacky M., 4,177,268, Cl. 424-243.000.

Aude, Thomas C., to Bechtel International Corporation. Self cleaning manifold connection for slurry pump. 4,177,016, Cl. 417-53.000.

August, Peter: *See—*
Kreis, Gerhard; August, Peter; and Wick, Manfred, 4,177,341, Cl. 528-15.000.

Austin, Arthur L.; Levis, William W., Jr.; Pizzini, Louis C.; and Hartman, Robert J., to BASF Wyandotte Corporation. Process for preparing a polyurethane foam from an oxyalkylated product. 4,177,335, Cl. 521-171.000.

Automated Donut Systems, Inc.: *See—*
Kochan, Kenneth, 4,176,590, Cl. 99-405.000.

Avco Corporation: *See—*
McClure, John W.; and Hudson, George S., 4,176,547, Cl. 73-136.00R.

Avon Industrial Polymers (Melksham) Limited: *See—*
Down, Clive L. C., 4,176,729, Cl. 180-127.000.

Awao, Takao: *See—*
Kobayashi, Mituki; Awao, Takao; Mizusaki, Yujiro; Sato, Kunio; Kato, Akio; and Mituishi, Hisao, 4,177,069, Cl. 75-213.000.

Ayerst McKenna & Harrison Ltd.: *See—*
Philipp, Adolf H.; and Jirkovsky, Ivo L., 4,177,284, Cl. 424-275.000.

Aziz, Edward D. Sit-up exercising device. 4,176,835, Cl. 272-93.000.

B. V. Etikettenfabriek Gebroeders Mogendorff: *See—*
l'Hoir, Paul A. L., 4,176,479, Cl. 40-2.00R.

Backus Devices, Incorporated: *See—*
Backus, Harold A., 4,176,651, Cl. 123-27.0GE.

Backus, Harold A., to Backus Devices, Incorporated. Engine combustion system. 4,176,651, Cl. 123-27.0GE.

Baika, Toyokazu: *See—*
Nakamura, Norihiko; Toyama, Noboru; and Baika, Toyokazu, 4,176,635, Cl. 123-119.00A.

Bailey, Daniel R. Mobile visual signalling device. 4,176,483, Cl. 40-467.000.

Bain-Smith, Timothy: *See—*
Spence-Bate, Harry A. H.; and Bain-Smith, Timothy, 4,176,947, Cl. 355-53.000.

Baird, Thomas E. Suds-making and applying kit for converting upright vacuum sweepers to rug shampooers. 4,176,421, Cl. 15-320.000.

Bake, Earl A.: *See—*
Clapper, Robert L.; Schoneweis, E. Frederick; Hankosky, Andrew; and Bake, Earl A., 4,176,981, Cl. 403-31.000.

Baker International Corporation: *See*—
Bigelow, Eugene H.; and Goldsmith, Burton J., 4,176,715, Cl. 166-138.000.
McCombs, Russell L.; and Motsinger, James V., 4,176,436, Cl. 29-240.000.
Baker, Irwin G., to Boeing Company, The. Midcabin door for blended wing aircraft. 4,176,812, Cl. 244-129.500.
Balakrishnan, Ramachandran; and Skinner, Geoffrey F., to Foster Wheeler Energy Corporation. Extraction of gold and silver. 4,177,068, Cl. 75-105.000.
Balasubramanian, Peruvemba S.; and Greenspan, Stephen B., to International Business Machines Corporation. Electrically programmable logic array. 4,177,452, Cl. 340-166.00R.
Baldwin, Roger A.: *See*—
Rhodes, Donald E.; Baldwin, Roger A.; and Davis, Robert E., 4,177,134, Cl. 208-177.000.
Ball, Glenn A.: *See*—
Grawey, Charles E.; Ball, Glenn A.; and Zook, Donald G., 4,177,027, Cl. 425-49.000.
Ballert Orthopedic Corp.: *See*—
Perser, Donald A.; and Roman, Donald A., 4,176,459, Cl. 33-174.00D.
Balog, Edward J., Sr.: *See*—
Dunbar, David R.; and Balog, Edward J., Sr., 4,177,352, Cl. 174-1.000.
Bando, Yasuo: *See*—
Umemura, Sumio; Ohdan, Kyoji; Sakai, Fumihiko; Bando, Yasuo; and Ikezawa, Harumi, 4,177,161, Cl. 252-435.000.
Baney, Ronald H.; and Harris, Len A., to Dow Corning Corporation. Organothiol-containing siloxane resins as adhesion promoters for siloxane resins. 4,177,175, Cl. 260-29.20M.
Bankson, Billye, to Arnold Engineering Company, The. Magnetic particles and compacts thereof. 4,177,089, Cl. 148-31.550.
Barabash, Martin J.: *See*—
Barker, Graham; and Barabash, Martin J., 4,177,259, Cl. 424-63.000.
Barber, Bernard H., to Davy-Loewy Limited. Splined articulated coupling. 4,176,540, Cl. 72-201.000.
Barber, Ronnie J.: *See*—
Roesel, John F., Jr.; Ott, Richard R.; and Barber, Ronnie J., 4,177,414, Cl. 322-28.000.
Bardonnet, Pierre; and Chamberaud, Jean-Rene, to Essilor International (Compagnie Generale d'Optique). Device for attaching on a spectacle lens a block for mounting on an edging or bevelling machine. 4,176,501, Cl. 51-277.000.
Barker, Graham; and Barabash, Martin J., to Witco Chemical Corporation. Waterproof makeup and method of preparing same. 4,177,259, Cl. 424-63.000.
Barnabe, Jean-Louis M., to Regie Nationale des Usines Renault. Electrochemical detector of the oxygen content of the exhaust gases of combustion engines. 4,177,125, Cl. 204-195.00S.
Barnes, William; Gerstenberg, Roy W.; Kropa, Gomer E.; and Le-Jeune, Roland A., to Leesona Corporation. Feed device for sheet granulator and method of feeding same. 4,176,796, Cl. 241-30.000.
Baron, Barnett. Brewing apparatus. 4,176,588, Cl. 99-323.000.
Barr, Dwight L.; Barr, Leslie A.; Swett, Benson P.; and Ray, Charles M., to Barr Industries, Inc. Camper top tent assembly. 4,176,873, Cl. 296-156.000.
Barr Industries, Inc.: *See*—
Barr, Dwight L.; Barr, Leslie A.; Swett, Benson P.; and Ray, Charles M., 4,176,873, Cl. 296-156.000.
Barr, Leslie A.: *See*—
Barr, Dwight L.; Barr, Leslie A.; Swett, Benson P.; and Ray, Charles M., 4,176,873, Cl. 296-156.000.
Barry, Louis T.: *See*—
von Dreusche, Charles F., Jr.; and Barry, Louis T., 4,176,611, Cl. 110-225.000.
Bartoov, Benjamin; Mayevsky, Abraham; Mendel, Shmuel; and Oren, Amiram, to SEM Israel Limited. Method and apparatus for measuring the motility of sperm cells. 4,176,953, Cl. 356-73.000.
Basarova, Gabriela: *See*—
Kubanek, Vladimir; Basarova, Gabriela; Kralicek, Jaroslav; Skach, Josef; Fencl, Zdenek; Budin, Jiri; Kondelikova, Jaroslava; and Sittler, Eduard, 4,177,295, Cl. 426-330.300.
Baschang, Gerhard; Stanek, Jaroslav; Rossi, Alberto; and Sele, Alex, to Ciba-Geigy Corporation. Anhydro-sugars. 4,177,344, Cl. 536-4.000.
BASF Aktiengesellschaft: *See*—
Boettcher, Klaus; Hoerdt, Heinrich G.; Pfleger, Klaus; Zacher, Wieland; and Gropper, Hans, 4,177,340, Cl. 526-329.000.
Schoenafinger, Eduard; Deigner, Paul; Koester, Eberhard; Ohlinger, Manfred; Schaefer, Dieter; Stumpfi, Werner; Amort, Juergen; Seiler, Claus-Dietrich; Nestler, Heinz; and Ambros, Otto, 4,177,317, Cl. 428-405.000.
Selden, Peter H.; Duerkop, Joachim; Albrecht, Wolfgang; and Weissenmayer, Heinz, 4,177,032, Cl. 425-468.000.
BASF Wyandotte Corporation: *See*—
Austin, Arthur L.; Levis, William W., Jr.; Pizzini, Louis C.; and Hartman, Robert J., 4,177,335, Cl. 521-171.000.
Schaaf, Robert L.; Kan, Peter T.; and Cenker, Moses, 4,177,205, Cl. 260-453.0AM.
Bassi, Aldo, to Alfa Romeo S.p.A. Fuel-intermittent-injection installation for internal-combustion engines. 4,176,627, Cl. 123-32.0EB.
Bassler, Hans: *See*—
Panknin, Walter; Finsterwalder, Kurt; Kannegiesser, Reinhard; and Bassler, Hans, 4,176,536, Cl. 72-91.000.
Batchelor, John F.: *See*—
Hodson, Harold F.; and Batchelor, John F., 4,177,257, Cl. 424-46.000.
Bate, Geoffrey; and Dunn, Larry P., to International Business Machines Corporation. Production of magnetic media. 4,177,442, Cl. 335-284.000.
Batson, William A., to Singer Company, The. Guard mechanism for radial saw. 4,176,571, Cl. 83-397.000.
Battelle Development Corporation: *See*—
Rosenberg, Harvey S.; and Grotta, Henry M., 4,177,245, Cl. 423-242.000.
Baum, Joseph W., Sr.; and Timothy, Dave A. Rotor assembly. 4,177,009, Cl. 416-45.000.
Baumann, James R.; Comer, Robert C.; and Yourczek, Jerome F., to Toro Company, The. Line feed mechanism for filament mower. 4,176,508, Cl. 56-12.700.
Baxter Travenol Laboratories, Inc.: *See*—
Winchell, David A., 4,176,755, Cl. 215-32.000.
Bayer Aktiengesellschaft: *See*—
Bock, Manfred; Pedain, Josef; Slawyk, Wilhelm; and Konig, Klaus, 4,177,342, Cl. 528-45.000.
Bossert, Friedrich; Wehinger, Egbert; Heise, Arend; Kazda, Stanislav; Stoepel, Kurt; Towart, Robertson; Vater, Wulf; and Schlossmann, Klaus, 4,177,278, Cl. 424-266.000.
de Montigny, Armand; and Moretto, Hans-Heinrich, 4,177,201, Cl. 260-448.20E.
Mitschke, Karl-Heinz; Niederprum, Hans; and Kapps, Manfred, 4,177,332, Cl. 521-98.000.
Pieper, Christian; Sandhu, Surinder S.; Schummer, Gunter; and Feltgen, Karlheinz, 4,177,111, Cl. 203-14.000.
Scholl, Hans-Joachim; and Dieterich, Dieter, 4,177,206, Cl. 260-456.00P.
Seng, Florin; Sasse, Klaus; Beck, Gunther; Eue, Ludwig; and Schmidt, Robert R., 4,177,055, Cl. 71-92.000.
Tacke, Peter; Neuray, Dieter; and Michael, Dietrich, 4,177,185, Cl. 260-38.000.
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BBC Brown Boveri & Company: *See*—
DeBruyne, Patrick; and Sittig, Roland, 4,177,479, Cl. 357-38.000.
BBC Brown Boveri & Company Ltd.: *See*—
Fiorentzis, Michael, 4,177,419, Cl. 324-418.000.
Bean, James Richard: *See*—
Moore, Mary A., 4,177,266, Cl. 424-195.000.
Beane, Frank T. Special package and method. 4,176,748, Cl. 206-525.000.
Beauvillain, Gerard M.: *See*—
Bouillie, Remy A.; and Beauvillain, Gerard M., 4,176,954, Cl. 356-73.100.
Bechtel International Corporation: *See*—
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Beck, Gunther: *See*—
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Becker, Hubert: *See*—
Becker, Josef; Becker, Hubert; and Becker, Matthias, 4,176,811, Cl. 242-118.100.
Becker, Josef; Becker, Hubert; and Becker, Matthias. Conical yarn carrier. 4,176,811, Cl. 242-118.100.
Becker, Matthias: *See*—
Becker, Josef; Becker, Hubert; and Becker, Matthias, 4,176,811, Cl. 242-118.100.
Beckman Instruments, Inc.: *See*—
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Becton, Dickinson and Company: *See*—
Gellman, Barry N., 4,176,756, Cl. 215-274.000.
Beecham Group Limited: *See*—
Cassidy, Frederick; and Wootton, Gordon, 4,177,283, Cl. 424-274.000.
Khan, Karrar A.; and Cook, Brian, 4,177,254, Cl. 424-16.000.
Beecher, Robert L., II; and Hershey, Harold J., to Bell Telephone Laboratories, Incorporated. Multiple pushbutton switch. 4,177,364, Cl. 200-5.00B.
Beeghly, Bruce R., to Economy Engine Company, The. Pulse generating and distributing circuits for internal combustion engines or the like. 4,176,643, Cl. 123-146.50A.
Beeler, David R., to United States of America, Air Force. Non-combustible high temperature abradable seal material. 4,177,308, Cl. 428-117.000.
Been, Larry C. Apparatus and method for making bridgework. 4,176,706, Cl. 164-34.000.
Bekum Maschinenfabriken GmbH: *See*—
Gittner, Franz; Glaser, Arnaldo; and Kotke, Klaus D., 4,177,239, Cl. 264-530.000.
Bel Fuse Inc.: *See*—
Bernstein, Elliot, 4,176,902, Cl. 339-147.00P.
Bell, Joseph S.: *See*—
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Bell, Peter W.: *See*—
Smith, John B.; Bell, Peter W.; Queen, David S.; and Mitchell, John, 4,177,311, Cl. 428-246.000.
Bell, Robert L.; Willing, Robert; and Kavli, Fred, to Kavlico Corporation. Capacitive pressure transducer. 4,177,496, Cl. 361-283.000.
Bell Telephone Laboratories, Incorporated: *See*—
Beecher, Robert L., II; and Hershey, Harold J., 4,177,364, Cl. 200-5.00B.

Dixon, Richard W.; and Svacek, Joseph F., III, 4,177,436, Cl. 331-94.50S.
Marcatili, Enrique A. J.; and Marcuse, Dietrich, 4,176,911, Cl. 350-96.310.
Mathews, Max V., 4,177,354, Cl. 178-18.000.
Schaefer, Edwin M., III, 4,177,521, Cl. 365-8.000.
Wagner, Richard E., 4,176,908, Cl. 350-96.150.

Belles, Wayne S.: *See—*
Hunter, Don L.; and Belles, Wayne S., 4,177,057, Cl. 71-92.000.

Beloit Corporation: *See—*
Berry, Kenneth W., 4,177,304, Cl. 427-434.00R.
Brendemuehl, Roger C., 4,176,775, Cl. 226-7.000.

Bendig, Larry L.; Stowell, Donald E.; and Starks, Laura A., to Conoco, Inc. Production of low loose bulk density alumina. 4,177,251, Cl. 423-628.000.

Bendix Corporation, The: *See—*
Stauffer, Reuben L., 4,176,625, Cl. 123-32.0EH.

Bennett, Gregory B., to Sandoz, Inc. 6-(Substituted phenyl)-4,5-dihydro-pyridazin-3(2H)-ones. 4,177,273, Cl. 424-250.000.

Bentz, Helmut: *See—*
Alpers, Gunther; and Bentz, Helmut, 4,176,887, Cl. 305-57.000.

Berg, Verland V., to Berg, Verland V.; and Tracy, Raymond. Free standing fireplace. 4,176,652, Cl. 126-121.000.

Berggren, Kenneth S.: *See—*
Kubat, Josef; and Berggren, Kenneth S., 4,177,103, Cl. 156-500.000.

Bergman, Gunnar B.: *See—*
Goss, Wilbur H.; and Bergman, Gunnar B., 4,176,614, Cl. 114-125.000.

Bergstrom, Per-Olof: *See—*
Ahlen, Karl G.; Bergstrom, Per-Olof; and Supanich, Joseph, 4,176,564, Cl. 74-732.000.

Berkbigler, Kenneth A. Fuel metering rod position control. 4,177,225, Cl. 261-50.00A.

Berkoz, Belig: *See—*
Untch, Karl G.; Berkoz, Belig; and Unger, Stefan H., 4,177,280, Cl. 424-272.000.

Bernstein, Elliot, to Bel Fuse Inc. Method for fusing male plug at end of power line cord. 4,176,902, Cl. 339-147.00P.

Bernstein, Seymour: *See—*
Conrow, Ransom B.; and Bernstein, Seymour, 4,177,209, Cl. 260-506.000.

Berry, Kenneth W., to Beloit Corporation. Method of coating both sides of a travelling web. 4,177,304, Cl. 427-434.00R.

Bertil Wigemark AB: *See—*
Wigemark, Bertil V., 4,176,423, Cl. 16-125.000.

Bertolacini, Ralph J.: *See—*
Feinstein, Allen I.; Bertolacini, Ralph J.; and Kim, Dae K., 4,177,219, Cl. 585-489.000.

Bertrand, Jacques A.; and Marechal, Robert A., to Klippan France, S.A. Lock sensitivity adjustor. 4,176,810, Cl. 242-107.40B.

Betts, Edward E., to United States of America, Navy. Quick disconnect electrical connector having disassembly features for refurbishment. 4,176,899, Cl. 339-45.00M.

Bevilacqua, Frank, to Combustion Engineering, Inc. Nuclear fuel storage. 4,177,385, Cl. 250-507.000.

Bezvulyak, Anatoly S.; Gelfand, Ilya M.; Torchinsky, Efim M.; Pushkin, Sergei B.; Vedernikov, Rudolf K.; Kulachenkov, Gennady P.; Tkachuk, Petr F.; and Karyagin, Viktor F., to Vsesojuznynauchno-Issledovatelsky Institut Metlznol Promyshlennosti (Vniimetiz). Photoelectric pyrometer for measuring temperature of bodies of small cross-sectional dimensions which vary with respect to optical axis of pyrometer. 4,176,952, Cl. 356-47.000.

Biebricher, Christof; and Luce, Rudiger, to Max-Planck-Gesellschaft zur Forderung der Wissenschafen e.V. Method for the production of a vehicle substance which is capable of covalent bonding with biologically active matter. 4,177,038, Cl. 8-192.000.

Bielaczek, Herbert, to Brehm, Robert, a part interest. Method and apparatus for tapping groundwater. 4,176,716, Cl. 166-254.000.

Bielecki, Marek; Bogdanski, Andrzej; Buxakowski, Andrzej; Chudzinski, Janusz; Glogowski, Andrzej; Kopczynski, Marian; Krolikowski, Andrzej; Kryszewski, Jozef; Moczulski, Zdzislaw; Ochocki, Wlodzimierz; Pomorski, Aleksander; Rumatowski, Karol; Sawicki, Janusz; Szostakowski, Henryk; Warowny, Tadeusz; Wisniewski, Teofil; and Wozniak, Antoni, to Politechnika Poznanska; and Zaklady Przemyslu Metalowego. Diesel engine with electronic control. 4,176,624, Cl. 123-32.0EA.

Bietz, Rolf: *See—*
Lehmann, Hans-Juergen; Bietz, Rolf; and Wegner, Juergen, 4,177,294, Cl. 426-271.000.

Bigelow, Eugene H.; and Goldsmith, Burton J., to Baker International Corporation. High temperature well packer. 4,176,715, Cl. 166-138.000.

Bilal, Abdel-Latif: *See—*
Herrmann, Fritz; and Bilal, Abdel-Latif, 4,177,130, Cl. 204-299.00R.

Billings Energy Corporation: *See—*
Campbell, Barrie C., 4,177,118, Cl. 204-129.000.

Binder, Dieter: *See—*
Hromatka, Otto; Binder, Dieter; Pfister, Rudolf; and Zeller, Paul, 4,177,193, Cl. 549-64.000.

Bingham, Richard C., to Du Pont de Nemours, E. I., and Company. Organic pigments derived from benzocoumarin. 4,177,195, Cl. 260-343.210.

Binney & Smith Inc.: *See—*
Klara, Charles J.; Hohl, James H.; and Clymer, Wilbur L., 4,176,763, Cl. 221-93.000.

Bio-Energy Systems, Inc.: *See—*
Zinn, Michael F.; and Krulick, Steven E., 4,176,654, Cl. 126-448.000.

Biosonics International, Ltd.: *See—*
Hatter, Edward E.; Taylor, Richard H.; and McGunigle, Richard D., 4,176,454, Cl. 433-119.000.

Birck, Michael J., to Tellabs, Inc. Signaling tone transparent echo suppressor. 4,177,361, Cl. 179-170.200.

Birkmaier, Horst: *See—*
Severus, Harald; and Birkmaier, Horst, 4,177,299, Cl. 427-287.000.

Biro, Katalin: *See—*
Tuba, Zoltan; Marsai, Maria; Biro, Katalin; Szporny, Laszlo; Karpati, Egon; and Szeberenyi, Szabolcs, 4,177,190, Cl. 260-239.500.

Bischoff, Erich; Dangel, Jurgen; Schussler, Hans; Ricker, Thomas; and Stein, Erich, to Licentia Patent-Verwaltung-G.m.b.H. Method for producing a semiconductor fixed value ROM. 4,176,442, Cl. 29-571.000.

Bishai, Wilson B.; and McCloskey, John H., to Middle East Software Corporation. Interactive video display and editing of text in the Arabic script. 4,176,974, Cl. 400-111.000.

Blackman, Stanley J. Moisture reducer for use in heated and vented container including electrical contacts. 4,177,365, Cl. 200-19.00R.

Blackwood, William A. Forklift attachment for highway vehicles. 4,177,001, Cl. 414-628.000.

Blaetz, Philip H., to Kraft, Inc. Dasher. 4,176,970, Cl. 366-280.000.

Blakely, Lawrence E.: *See—*
Jaeger, C. Rene; and Blakely, Lawrence E., 4,177,356, Cl. 179-1.0VL.

Blaskowski, Henry J., to Combustion Engineering, Inc. Fluidized bed boiler. 4,176,623, Cl. 122-367.0PF.

Bliamptis, Emmanuel E., to United States of America, Air Force. High voltage antenna protection system. 4,177,493, Cl. 361-56.000.

Blue, Emanuel M., to Chevron Research Company. Method for producing an attrition-resistant adsorbent for sulfur dioxide, the resulting composition and a process using same. 4,177,158, Cl. 252-189.000.

Bobo, Melvin: *See—*
Riedmiller, Charles F.; and Bobo, Melvin, 4,177,004, Cl. 415-116.000.

Bocckino, Harry G.: *See—*
Pepper, Terry W.; and Bocckino, Harry G., 4,177,067, Cl. 75-104.000.

Bochis, Richard J.; and Kulsa, Peter, to Meck & Co., Inc. Substituted imidazo [1,2-a] pyridines. 4,177,274, Cl. 424-256.000.

Bock, Manfred; Pedain, Josef; Slawyk, Wilhelm; and Konig, Klaus, to Bayer Aktiengesellschaft. Process for the preparation of polyisocyanates containing allophanate groups. 4,177,342, Cl. 528-45.000.

Bodendorfer, Roland, to TMC Corporation. Safety ski binding. 4,176,857, Cl. 280-613.000.

Bodenseewerk Perkin-Elmer & Co. GmbH: *See—*
Tomoff, Toma; and Tamm, Rolf G. A., 4,176,956, Cl. 356-312.000.

Boeing Company, The: *See—*
Baker, Irwin G., 4,176,812, Cl. 244-129.500.

Boenecke, Charles A. Tamperproof handset connector arrangement for railroad applications. 4,177,362, Cl. 179-186.000.

Boettcher, Klaus; Hoerdt, Heinrich G.; Pfleger, Klaus; Zacher, Wieland; and Gropper, Hans, to BASF Aktiengesellschaft. Manufacture of high-pressure polyethylene. 4,177,340, Cl. 526-329.000.

Bogachenko, Alexei G.: *See—*
Paton, Boris E.; Medovar, Boris I.; Tsukanov, Georgy E.; Bogachenko, Alexei G.; Artamonov, Viktor L.; Timashov, Grigory A.; Shtanko, Jury P.; Marchenko, Alexandr M.; Fedorovsky, Boris B.; Kumysh, Ilya I.; Chepurnoi, Anatoly D.; Saenko, Vladimir Y.; and Semin-Vadov, Gennady M., 4,177,058, Cl. 75-10.00C.

Bogdanski, Andrzej: *See—*
Bielecki, Marek; Bogdanski, Andrzej; Buxakowski, Andrzej; Chudzinski, Janusz; Glogowski, Andrzej; Kopczynski, Marian; Krolikowski, Andrzej; Kryszewski, Jozef; Moczulski, Zdzislaw; Ochocki, Wlodzimierz; Pomorski, Aleksander; Rumatowski, Karol; Sawicki, Janusz; Szostakowski, Henryk; Warowny, Tadeusz; Wisniewski, Teofil; and Wozniak, Antoni, 4,176,624, Cl. 123-32.0EA.

Bohen, Joseph M., to Pennwalt Corporation. Stabilizers for halogenated resins. 4,177,187, Cl. 260-45.75S.

Bohen, Joseph M., to Pennwalt Corporation. Process for preparing alkaline earth metal mercaptides. 4,177,198, Cl. 260-399.000.

Boje, Daniel Q., to Agar International Ltd. Large screen television. 4,177,484, Cl. 358-254.000.

Bolton-Emerson, Inc.: *See—*
Hutchins, Clement A., 4,176,570, Cl. 83-355.000.

Boltswitch, Inc.: *See—*
Erickson, James A., 4,177,368, Cl. 200-332.000.

Bommart, Patrick, to C. Delachaux. Setting arrangement for alignment and gap between two rail ends. 4,176,777, Cl. 228-5.100.

Bonhomme, Pierre: *See—*
Jay, Pierre; and Bonhomme, Pierre, 4,177,156, Cl. 252-66.000.

Borberg, Hartmut, to Apparatebau Gauting GmbH; and Ernst Muller KG. Mixing apparatus for a first liquid component with at least one additional component. 4,176,672, Cl. 137-99.000.

Borg-Warner Corporation: *See—*
Roberts, Richard W., 4,176,737, Cl. 192-82.00T.

Borginon, Hendrik A.: *See—*
De Brabandere, Luc A.; Borginon, Hendrik A.; Pattyn, Herman A.; and Pollet, Robert J., 4,177,071, Cl. 430-494.000.

Bornemann, Hans-Joachim, to Thyssen Industrie Aktiengesellschaft. Mixing apparatus. 4,176,966, Cl. 366-78.000.

Borzak, Robert A., to Ampex Corporation. Tape reel container. 4,176,744, Cl. 206-303.000.

Bossert, Friedrich; Wehinger, Egbert; Heise, Arend; Kazda, Stanislav; Stoepel, Kurt; Towart, Robertson; Vater, Wulf; and Schlossmann, Klaus, to Bayer Aktiengesellschaft. 2-Alkyleneaminodihydropyridines compounds, their production and their medicinal use. 4,177,278, Cl. 424-266.000.

Bostick, Joseph: *See—*
Wilkinson, Elizabeth P., 4,176,773, Cl. 224-205.000.

Boswell, James W. Bicycle path transport system. 4,176,982, Cl. 404-34.000.

Boucher, Claude; and Boucher, Jacqueline. Agrarian stake. 4,176,494, Cl. 47-47.000.

Boucher, Jacqueline: *See—*
Boucher, Claude; and Boucher, Jacqueline, 4,176,494, Cl. 47-47.000.

Bouillie, Remy A.; and Beauvillain, Gerard M. Equipment for measuring the length of dielectric elements transmitting optical frequencies. 4,176,954, Cl. 356-73.100.

Bourdon, Claude G.: *See—*
Robert, Andre J.; Bourdon, Claude G.; Msika, Nessim C.; Chorlay, Etienne G.; and Euzenade, Jean-Louis, 4,176,951, Cl. 356-33.000.

Bourgoin, Bernard, to Centre Technique des Industries Mecaniques. Sprinkling device for grinding wheels. 4,176,500, Cl. 51-267.000.

Bouvaist, Jean-Marie A.; and Lacoste, Georges, to Societe pour le Forgeage et l'Estampage des Alliages Legers FORGEAL. Process for the thermal treatment and the quenching of forged articles. 4,177,086, Cl. 148-12.70A.

Bowden, William L.: *See—*
Dey, Arabinda N.; Miller, John S.; and Bowden, William L., 4,177,329, Cl. 429-101.000.

Bowes, Alan: *See—*
Scudder, Roy; and Bowes, Alan, 4,176,511, Cl. 56-330.000.

Boy, Aristide; Galy, Henri; Ivaldi, Raoul; and Passedroit, Hubert, to ATO Chemie. Process for preparing sulphonic acids and sulphonates. 4,177,208, Cl. 260-504.00S.

Bozung, Hans-Gunther; and Mendle, Hans, to Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft (M.A.N.). Variable-throat spiral duct system for rotary stream-flow machines. 4,177,005, Cl. 415-128.000.

Bradley, John J.: *See—*
Appell, Marc; Lepicard, Georges; de Rivet, Philippe-Hubert; Bradley, John J.; and Franklin, Benjamin S., 4,177,510, Cl. 364-200.000.

Braukmann Armaturen AG: *See—*
Braukmann, Heinz W., 4,176,786, Cl. 236-99.00K.

Braukmann, Heinz W., to Braukmann Armaturen AG. Concealed thermostatic control valve. 4,176,786, Cl. 236-99.00K.

Braun Aktiengesellschaft: *See—*
Roth, Johann; and Schneider, Peter, 4,176,922, Cl. 352-27.000.

Bray, Geddes A., to Mather & Platt Limited. Heat sensitive release devices. 4,176,719, Cl. 169-39.000.

Brayton, Robert K., to International Business Machines Corporation. Character recognition system and method multi-bit curve vector processing. 4,177,448, Cl. 340-146.3AE.

Brehm, Robert: *See—*
Bielaczek, Herbert, 4,176,716, Cl. 166-254.000.

Breitenkam, Fred J.; and Landrith, James E., to Van Dyk Research Corporation. Malfunction display system for electrophotographic copying machines. 4,176,941, Cl. 355-14.00R.

Brelen, Hans E. O.: *See—*
Otteblad, Sven I. A.; Brynielsson, Erner T. O.; Dovertie, Ralph G.; Franzen, Stig E. R.; and Brelen, Hans E. O., 4,176,728, Cl. 180-168.000.

Brendemuehl, Roger C., to Beloit Corporation. Inhibiting noise in sheet spreaders. 4,176,775, Cl. 226-7.000.

Brennan, Michael P. J., to Chloride Silent Power Limited. Method for making an electrode. 4,176,447, Cl. 29-623.500.

Brewer, John C., to Garbalizer Corporation of America. Materials reduction structure. 4,176,800, Cl. 241-243.000.

Brewer, Marie-Louise. Calendar. 4,176,478, Cl. 40-107.000.

Bridgestone Tire Company Limited: *See—*
Nojima, Hiroshi; and Nishimura, Masahiro, 4,176,703, Cl. 152-209.00B.

Brinkmann, Heinz; and Spielhoff, Horst, to Hermann Berstorff Maschinenbau GmbH. Apparatus for the preparation of thermoplastic materials. 4,176,967, Cl. 366-83.000.

Bristol-Myers Company: *See—*
Granatek, Edmund S.; Ruva, Frank D.; and Grab, Frederick L., 4,177,199, Cl. 260-430.000.

British Gas Corporation: *See—*
Jude, Dennis W.; and Bell, Joseph S., 4,176,691, Cl. 138-103.000.
Wood, Andrew, 4,177,042, Cl. 48-87.000.

British Petroleum Company Limited, The: *See—*
Eyles, Martin K.; and Wagner, Graham L., 4,176,544, Cl. 73-61.200.

British Steel Corporation: *See—*
Williams, Ernald V., 4,177,318, Cl. 428-408.000.

Brittingham, William C. Bee frame caddy. 4,176,416, Cl. 6-12.00R.

Broadway, William W., to FMC Corporation. Pressure-sensitive temperature-responsive rotary valve for cryogenic temperatures. 4,176,820, Cl. 251-317.000.

Brock, James H. Quick disconnect trailer hitch. 4,176,853, Cl. 280-423.00R.

Broghammer, Werner, to Dual Gebruder Steidenger. Switching device for cassette tape recorders. 4,177,490, Cl. 360-105.000.

Bronz Engineering Company, Ltd., The: *See—*
Brown, Arthur N., 4,176,537, Cl. 72-98.000.

Brookhyser, Byron B., to Weyerhaeuser Company. Apparatus for aligning thin sheets at work station. 4,176,467, Cl. 34-236.000.

Brown, Arthur N., to Bronz Engineering Company, Ltd., The. Method of and means for straightening bars and tubes. 4,176,537, Cl. 72-98.000.

Brown, David A.; Norman, Jan L.; and Whitson, Donald W., to All Phase Electronics, Inc. Smoke alarm device for a grain dryer. 4,177,461, Cl. 340-628.000.

Brown, Fred A., III: *See—*
Hughes, Francis H.; Morton, Kenneth O.; LeMere, Roger; and Brown, Fred A., III, 4,176,832, Cl. 271-10.000.

Brown, Harry J.; and Chopra, Kuldip S., to Union Carbide Corporation. Hard facing of metal substrates using material containing V, W, Mo, C. 4,177,324, Cl. 428-627.000.

Brown, Robert T., to United Technologies Corporation. Optically pumped laser. 4,177,435, Cl. 331-94.50G.

Brown, Winthrop K.: *See—*
Nolte, David G.; and Brown, Winthrop K., 4,176,543, Cl. 73-40.50A.

Brueckner, Karl H.; Farel, Charles A.; and Irsik, Johnnie F., to International Business Machines Corporation. Flux controlled shunt regulated transformer. 4,177,418, Cl. 323-56.000.

Brunsch, Klaus: *See—*
Schulz, Ralf-Thilo; Brunsch, Klaus; and Lemmer, Ludwig, 4,177,306, Cl. 428-107.000.

Brynielsson, Erner T. O.: *See—*
Otteblad, Sven I. A.; Brynielsson, Erner T. O.; Dovertie, Ralph G.; Franzen, Stig E. R.; and Brelen, Hans E. O., 4,176,728, Cl. 180-168.000.

Buchner, Helmut, to Daimler-Benz Aktiengesellschaft. Contactless switching element for electric current. 4,177,445, Cl. 338-34.000.

Budin, Jiri: *See—*
Kubanek, Vladimir; Basarova, Gabriela; Kralicek, Jaroslav; Skach, Josef; Fencl, Zdenek; Budin, Jiri; Kondelikova, Jaroslava; and Sittler, Eduard, 4,177,295, Cl. 426-330.300.

Budzich, Tadeusz. Load responsive fluid control valves. 4,176,521, Cl. 60-445.000.

Bullinga, Johannes, to Rockwell International Corporation. Self-excited inverter with suppressed current spikes. 4,177,509, Cl. 363-133.000.

Bunker Ramo Corporation: *See—*
Cameron, John K., 4,176,897, Cl. 339-40.000.
Johnston, Samuel A., 4,176,557, Cl. 73-708.000.

Bunyan's Woodcutter Corp.: *See—*
Greeninger, Carroll D., 4,176,696, Cl. 144-3.00K.

Bureau de Recherches Geologiques et Minieres: *See—*
Clin, Francois H.; Gony, Jean-Noel; and Proust, Francois O., 4,176,799, Cl. 241-74.000.

Burgess, Dennis A., to Burgess Industries, Inc. Microfiche exposer. 4,176,949, Cl. 355-104.000.

Burgess Industries, Inc.: *See—*
Burgess, Dennis A., 4,176,949, Cl. 355-104.000.

Burough, Irvin G.: *See—*
McClatchie, Edward A.; Watson, Dean A.; and Burough, Irvin G., 4,177,381, Cl. 250-343.000.

Burrill, Peter M.; and Rankin, Frank S., to Dow Corning Limited. Treatment of fibres. 4,177,176, Cl. 260-29.20M.

Burroughs Corporation: *See—*
Aldridge, Lionel D., 4,176,895, Cl. 339-17.0CF.
Holmberg, Scott H., 4,177,475, Cl. 357-2.000.
Moggia, Richard A., 4,177,512, Cl. 364-200.000.
Taddei, Vincent J., 4,177,511, Cl. 364-200.000.

Burroughs Wellcome Co.: *See—*
Hodson, Harold F.; and Batchelor, John F., 4,177,257, Cl. 424-46.000.

Busch, Dieter: *See—*
Stein, Manfred; and Busch, Dieter, 4,176,515, Cl. 58-19.00R.

Buschermohle, Gregor, to Keller Ofenbau GmbH. Tunnel kiln for firing ceramic ware. 4,177,035, Cl. 432-121.000.

Bush Boake Allen Limited: *See—*
Cookson, Richard C.; and Ferro, Lorenzo D., 4,177,170, Cl. 252-522.000.

Buxakowski, Andrzej: *See—*
Bielecki, Marek; Bogdanski, Andrzej; Buxakowski, Andrzej; Chudzinski, Janusz; Glogowski, Andrzej; Kopczynski, Marian; Krolikowski, Andrzej; Kryszewski, Jozef; Moczulski, Zdzislaw; Ochocki, Wlodzimierz; Pomorski, Aleksander; Rumatowski, Karol; Sawicki, Janusz; Szostakowski, Henryk; Warowny, Tadeusz; Wisniewski, Teofil; and Wozniak, Antoni, 4,176,624, Cl. 123-32.0EA.

C. Delachaux: *See—*
Bommart, Patrick, 4,176,777, Cl. 228-5.100.

C. H. Anderson and Associates Ltd.: *See—*
Anderson, Clay H.; and St. Jean, Gerard, 4,176,827, Cl. 254-186.00R.

C. Otto & Comp. G.m.b.H.: *See—*
Hahn, Ulrich; and Stumpe, Klaus, 4,177,139, Cl. 210-33.000.

Cable Caddy, Inc.: *See—*
Douglas, Homer C., 4,176,801, Cl. 242-54.00R.

Cadden, Duane L.: *See—*
Antonucci, Ermen S.; Cadden, Duane L.; Regenbrecht, Albert; and Schwartz, Edward, 4,176,891, Cl. 316-2.000.

Cairo, Anthony C.; Tillmann, Ditmar K.; and Insley, Gene I., to Robertshaw Controls Company. Plug in igniter unit and method of making the same. 4,176,903, Cl. 339-147.00R.

California R & D Center: *See*—
Sims, Anson; and Jones, Lawrence T., 4,176,492, Cl. 46-22.000.
Cameron, John K., to Bunker Ramo Corporation. EMI protected connector assembly. 4,176,897, Cl. 339-40.000.
Camirand, Wayne M.: *See*—
Popper, Karel; and Camirand, Wayne M., 4,177,146, Cl. 210-137.000.
Campbell, Barrie C., to Billings Energy Corporation. Process for electrolyzing water. 4,177,118, Cl. 204-129.000.
Campbell, Joseph M.; and Minyard, Larry J., to Teledyne Industries, Inc. System for encoding of bass and treble expression effects while recording from the keyboard of an electronic player piano. 4,176,578, Cl. 84-115.000.
Canadian Patents and Development Limited: *See*—
Thayer, William L.; Pageau, Lucien; and Sourirajan, Srinivasa, 4,177,031, Cl. 425-460.000.
Canevari, Roger: *See*—
Regnier, Gilbert; Canevari, Roger; Laubie, Michel; and Poignant, Jean-Claude, 4,177,272, Cl. 424-250.000.
Canon Kabushiki Kaisha: *See*—
Fujibayashi, Kazuo, 4,176,914, Cl. 350-214.000.
Ito, Fumio; Tsunekawa, Tokuichi; Taguchi, Tetsuya; and Harigaya, Isao, 4,176,929, Cl. 354-29.000.
Ito, Yuji, 4,176,920, Cl. 351-7.000.
Kozuki, Susumu; Uchidoi, Masanori; Date, Nobuaki; Shimizu, Masami; Aizawa, Hiroshi; and Takishima, Yoshiyuki, 4,176,936, Cl. 354-38.000.
Matsumoto, Kazuya; Kawamura, Naoto; and Minami, Setsuo, 4,176,907, Cl. 350-6.800.
Takahashi, Yuji, 4,176,834, Cl. 271-116.000.
Canron, Inc.: *See*—
von Beckmann, Helmuth, 4,176,456, Cl. 33-1.00Q.
Cappon, Arthur M., to Raytheon Company. A field effect transistor logic gate having depletion mode and enhancement mode transistors. 4,177,390, Cl. 307-205.000.
Capra, Nicholas G.; and Antenore, Ronald L., to James D. Pauls, Ltd. Mechanically operated mixing dispenser having a plurality of expansible chambers and a plurality of accumulating chambers. 4,176,764, Cl. 222-135.000.
Carel, Pierre, to Cibie Projecteurs. Indicator light with incorporated catadioptric element for automobile. 4,177,505, Cl. 362-309.000.
Carl Hurth Maschinen- und Zahnradfabrik: *See*—
Eichinger, Johann, 4,176,549, Cl. 73-162.000.
Carpenter, Frank M., to Neotec Corporation. Cam filter wheel. 4,176,916, Cl. 350-315.000.
Carr, Brian J., to Diamond Shamrock Corporation. Polyepoxide curing by polymercaptans catalyzed by dimethylamino alkyl ethers. 4,177,173, Cl. 260-18.0EP.
Carrera International Corporation: *See*—
Matthias, Jan H., 4,176,410, Cl. 2-436.000.
Matthias, Jan H., 4,176,921, Cl. 351-106.000.
Carrier Corporation: *See*—
Clark, William E.; and Herb, Carl C., 4,176,690, Cl. 137-8.000.
Carson, William W.: *See*—
Holtzapple, Mark T.; Wehe, Robert L.; Myer, Charles G.; and Carson, William W., 4,176,522, Cl. 60-459.000.
Cascade Corporation: *See*—
Weinert, Harry F.; McCart, Larry D.; and Weisgerber, David J., 4,177,000, Cl. 414-620.000.
Case, Richard W., to K-Shox, Inc. Shock absorber for oil well pumping unit. 4,176,714, Cl. 166-72.000.
Cassidy, Frederick; and Wootton, Gordon, to Beecham Group Limited. Aromatic prostaglandin analogues. 4,177,283, Cl. 424-274.000.
Castoe, John H. Apparatus for removing rocker arms. 4,176,435, Cl. 29-220.000.
Caterpillar Tractor Co.: *See*—
Grawey, Charles E.; Ball, Glenn A.; and Zook, Donald G., 4,177,027, Cl. 425-49.000.
Keffeler, Gary L., 4,176,457, Cl. 33-126.70R.
Cattaneo, Maurizio; and Masoero, Renzo, to Fiat Societa per Azioni. Automatically controlled irrigation system. 4,176,791, Cl. 239-76.000.
CECA S.A.: *See*—
Sarrut, Jean P., 4,177,152, Cl. 252-2.000.
Cecchin, Giuliano; Luciani, Luciano; and Griselli, Pier Luigi, to Montedison S.p.A. Catalytic components and catalysts for the polymerization of olefins. 4,177,160, Cl. 252-429.00B.
Cello Chemical Company: *See*—
Magid, David J., 4,176,420, Cl. 15-230.000.
Celloplast AB Norrkoeping: *See*—
Kubat, Josef; and Berggren, Kenneth S., 4,177,103, Cl. 156-500.000.
Cenker, Moses: *See*—
Schaaf, Robert L.; Kan, Peter T.; and Cenker, Moses, 4,177,205, Cl. 260-453.0AM.
Centre Technique des Industries Mecaniques: *See*—
Bourgoin, Bernard, 4,176,500, Cl. 51-267.000.
Ceskoslovenska akademie ved: *See*—
Sipek, Emil; and Simecek, Tomislav, 4,176,962, Cl. 356-400.000.
Chadwick, Alexander, to Chrysler Corporation. Fuel injection system and control valve for multi-cylinder engines. 4,176,822, Cl. 251-129.000.
Chadwick, Duane G., to Utah State University Foundation. Heat-powered water pump. 4,177,019, Cl. 417-379.000.
Chadwick, Duane G., to Utah State University Foundation. Heat-powered water pump. 4,177,020, Cl. 417-379.000.
Chadwick, Kenneth E.; Chia, E. Henry; and Powers, Frank M., to Southwire Company. Method for solution heat treatment of 6201 aluminum alloy. 4,177,085, Cl. 148-2.000.
Chakrabarti, Paritosh M., to GAF Corporation. Synthetic aqueous based metal working fluid compositions. 4,177,154, Cl. 252-32.500.
Chamberaud, Jean-Rene: *See*—
Bardonnet, Pierre; and Chamberaud, Jean-Rene, 4,176,501, Cl. 51-277.000.
Chamberlin, Howard A., Jr., to Hendrix Electronics Incorporated. Video amplifier for displaying four or more video levels on a cathode ray tube. 4,177,409, Cl. 315-383.000.
Chang, Clarence D.; and Lang, William H., to Mobil Oil Corporation. Methanation of synthesis gas. 4,177,202, Cl. 260-449.00R.
Chapdelaine, Martial. Photocell-controlled lighting system. 4,177,405, Cl. 315-159.000.
Chapman, Robert D.: *See*—
Euzarraga, Rosendo; Winkler, Robert J.; and Chapman, Robert D., 4,176,480, Cl. 40-155.000.
Charles, Herbert N., to Fram Corporation. Fan blade with bends forming general blade curvature. 4,177,012, Cl. 416-132.00A.
Chen, Robert H. K., to Ortho Pharmaceutical Corporation. Total synthesis of the utero-evacuant substance D,L-zoapatanol. 4,177,194, Cl. 260-333.000.
Chepurnoi, Anatoly D.: *See*—
Paton, Boris E.; Medovar, Boris I.; Tsukanov, Georgy E.; Bogachenko, Alexei G.; Artamonov, Viktor L.; Timashov, Grigory A.; Shtanko, Jury P.; Marchenko, Alexandr M.; Fedorovsky, Boris B.; Kumysh, Ilya I.; Chepurnoi, Anatoly D.; Saenko, Vladimir Y.; and Semin-Vadov, Gennady M., 4,177,058, Cl. 75-10.00C.
Cherrington, Martin D., to Reading and Bates Construction Co. System and method for installing production casings. 4,176,985, Cl. 405-184.000.
Chevron Research Company: *See*—
Blue, Emanuel M., 4,177,158, Cl. 252-189.000.
Lowe, Warren, 4,177,153, Cl. 252-32.70E.
Cheynet, Claudius. Device for covering warp yarn with covering yarns. 4,176,530, Cl. 66-203.000.
Chia, E. Henry: *See*—
Chadwick, Kenneth E.; Chia, E. Henry; and Powers, Frank M., 4,177,085, Cl. 148-2.000.
Chinchen, Godfrey C., to Imperial Chemical Industries Limited. Low temperature shift conversion process. 4,177,252, Cl. 423-656.000.
Chloride Silent Power Limited: *See*—
Brennan, Michael P. J., 4,176,447, Cl. 29-623.500.
Choay, Jean: *See*—
Lormeau, Jean-Claude; Choay, Jean; and Goulay, Jean, 4,177,262, Cl. 424-105.000.
Choay S.A.: *See*—
Lormeau, Jean-Claude; Choay, Jean; and Goulay, Jean, 4,177,262, Cl. 424-105.000.
Chopra, Kuldip S.: *See*—
Brown, Harry J.; and Chopra, Kuldip S., 4,177,324, Cl. 428-627.000.
Chorlay, Etienne G.: *See*—
Robert, Andre J.; Bourdon, Claude G.; Msika, Nessim C.; Chorlay, Etienne G.; and Euzenade, Jean-Louis, 4,176,951, Cl. 356-33.000.
Christoph, Dieter, to Schulz, Siegfried, a part interest. Spherical bearing seat cutter machine. 4,176,565, Cl. 82-12.000.
Christopher, Robert J.; and Schaaf, Robert L., to International Business Machines Corporation. Reel motor preamplifier. 4,177,433, Cl. 330-265.000.
Chrysler Corporation: *See*—
Chadwick, Alexander, 4,176,822, Cl. 251-129.000.
Chubb Industries Limited: *See*—
Markham, Michael H.; and Ruston, Rudolf S., 4,176,610, Cl. 109-59.00R.
Chudzinski, Janusz: *See*—
Bielecki, Marek; Bogdanski, Andrzej; Buxakowski, Andrzej; Chudzinski, Janusz; Glogowski, Andrzej; Kopczynski, Marian; Krolikowski, Andrzej; Kryszewski, Jozef; Moczulski, Zdzislaw; Ochocki, Wlodzimierz; Pomorski, Aleksander; Rumatowski, Karol; Sawicki, Janusz; Szostakowski, Henryk; Warowny, Tadeusz; Wisniewski, Teofil; and Wozniak, Antoni, 4,176,624, Cl. 123-32.0EA.
Chung, David H., to Umtech, Inc. Computer control of television receiver display. 4,177,462, Cl. 340-703.000.
Ciba-Geigy Corporation: *See*—
Baschang, Gerhard; Stanek, Jaroslav; Rossi, Alberto; and Sele, Alex, 4,177,344, Cl. 536-4.000.
Meyer, Hans R., 4,177,347, Cl. 542-459.000.
Mueller, Karl F.; and Good, William R., 4,177,056, Cl. 71-93.000.
Popplewell, Alan F., deceased; and Clark, David R., 4,177,155, Cl. 252-49.300.
Robertson, George H., 4,177,082, Cl. 106-309.000.
Rody, Jean; Greber, Gerd; and Muller, Helmut, 4,177,186, Cl. 260-45.80N.
Schmidt, Andreas, 4,177,213, Cl. 260-590.00R.
Weiss, Jonas, 4,177,302, Cl. 427-407.00C.
Cibie Projecteurs: *See*—
Carel, Pierre, 4,177,505, Cl. 362-309.000.
Citation Manufacturing Co., Inc.: *See*—
Heinrich, Elmer G., 4,176,793, Cl. 239-407.000.
Cities Service Company: *See*—
Gohlke, Arthur F., 4,177,288, Cl. 424-294.000.

Citizen Watch Co. Ltd.: *See*—
Yoshida, Makoto, 4,176,517, Cl. 58-23.00R.
Citrin, Paul S., to Indicon Inc. Fast responsive valve. 4,176,671, Cl. 137-1.000.
Cla-Val Co.: *See*—
Ensign, Harold W., 4,176,687, Cl. 137-625.650.
Clapper, Robert L.; Schoneweis, E. Frederick; Hankosky, Andrew; and Bake, Earl A., to Rockwell International Corporation. Device for coupling a pair of rods. 4,176,981, Cl. 403-31.000.
Clarion Co. Ltd.: *See*—
Hasegawa, Isao, 4,177,489, Cl. 360-74.200.
Clark, David R.: *See*—
Popplewell, Alan F., deceased; and Clark, David R., 4,177,155, Cl. 252-49.300.
Clark, William E.; and Herb, Carl C., to Carrier Corporation. Regulator for a damper assembly. 4,176,690, Cl. 137-8.000.
Clarke, George C. Variable speed drive. 4,176,560, Cl. 74-230.17A.
Clin, Francois H.; Gony, Jean-Noel; and Proust, Francois O., to Bureau de Recherches Geologiques et Minieres. Rotary screens. 4,176,799, Cl. 241-74.000.
Clipston, Robert H.; Hall, Emerson O.; and Ng, Hon-Hei F., to Dominion Foundries and Steel, Limited. Method of galvanizing a portion only of a ferrous metal article. 4,177,303, Cl. 427-259.000.
Cluett, Peabody & Co., Inc.: *See*—
Hughes, Francis H.; Morton, Kenneth O.; LeMere, Roger; and Brown, Fred A., III, 4,176,832, Cl. 271-10.000.
Clumpner, Joseph A., to Swiss Aluminium Ltd. Method for the degassing and filtration of molten metal. 4,177,065, Cl. 75-93.00E.
Clumpner, Joseph A., to Swiss Aluminium Ltd. Method and apparatus for the removal of impurities from molten metal. 4,177,066, Cl. 75-93.00E.
Clymer, Wilbur L.: *See*—
Klara, Charles J.; Hohl, James H.; and Clymer, Wilbur L., 4,176,763, Cl. 221-93.000.
Cohen, Joseph; and Adjemian, Alain, to Aluminum Pechiney. Method of obtaining pure alumina by acid attack on aluminous minerals containing other elements. 4,177,242, Cl. 423-83.000.
Cole, George A. Security gate post. 4,176,868, Cl. 292-258.000.
Cole, H. Ray. Lock device for dump trucks. 4,176,881, Cl. 298-22.00J.
Cole, James D., to F. D. Farnam Co. Apparatus for electrostatic fuel mixing. 4,176,637, Cl. 123-119.00E.
Colgate Palmolive Company: *See*—
Gaffar, Maria C. S.; and Gaffar, Abdul, 4,177,258, Cl. 424-52.000.
Collender, Robert B. Stereoscopic motion picture large scale scanning reproduction method and apparatus. 4,176,923, Cl. 352-58.000.
Collin, John, to Massey-Ferguson Services N.V. Hitch adaptor. 4,176,852, Cl. 280-415.00A.
Collins, John J.: *See*—
Nicholl, Thomas H.; and Collins, John J., 4,177,500, Cl. 362-20.000.
Collins, Johnny, to Zenith Radio Corporation. Digital remote control system with improved noise immunity. 4,177,453, Cl. 340-171.00A.
Colt Industries Operation Corp.: *See*—
McCabe, Ralph P., 4,176,633, Cl. 123-102.000.
Combustion Engineering, Inc.: *See*—
Bevilacqua, Frank, 4,177,385, Cl. 250-507.000.
Blaskowski, Henry J., 4,176,623, Cl. 122-367.0PF.
Comer, Robert C.: *See*—
Baumann, James R.; Comer, Robert C.; and Yourczek, Jerome F., 4,176,508, Cl. 56-12.700.
Cominco Ltd.: *See*—
Kerby, Robert C., 4,177,117, Cl. 204-114.000.
Commonwealth of Australia, The: *See*—
Kossoff, George; and Robinson, David E., 4,176,658, Cl. 128-660.000.
Compagnie Industrielle des Telecommunications Cit-Alcatel: *See*—
Jaouen, Jean-Yves, 4,177,447, Cl. 340-146.1AB.
Compagnie Internationale pour l'Informatique, CII Honeywell Bull: *See*—
Appell, Marc; Lepicard, Georges; de Rivet, Philippe-Hubert; Bradley, John J.; and Franklin, Benjamin S., 4,177,510, Cl. 364-200.000.
Compagnie Internationale pour l'Informatique Cii - Honeywell Bull (Societe Anonyme): *See*—
Sarrand, Pierre, 4,177,450, Cl. 340-147.0LP.
Concordia Fluidtechnik GmbH: *See*—
Stahle, Kurt, 4,176,686, Cl. 137-604.000.
Concrete Industries (Monier) Limited: *See*—
Day, Henry, 4,177,232, Cl. 264-133.000.
Condon, Michael E.: *See*—
Ondetti, Miguel A.; and Condon, Michael E., 4,177,277, Cl. 424-263.000.
Condon, Nancy J., to Shell Oil Company. Polymeric blend for automotive applications. 4,177,184, Cl. 260-32.60A.
Connor, Peter J., to Mosser Industries, Inc. Purged sliding gate valve. 4,176,673, Cl. 137-240.000.
Conoco, Inc.: *See*—
Bendig, Larry L.; Stowell, Donald E.; and Starks, Laura A., 4,177,251, Cl. 423-628.000.
Conrow, Ransom B.; and Bernstein, Seymour, to American Cyanamid Company. Ureylenebis(anionic substituted phenylene carbonyl)imino naphthalene sulfonic acids and naphthalene carboxylic acids and their salts. 4,177,209, Cl. 260-506.000.
Consortium Fur Elektrochemische Industrie GmbH: *See*—
Kreis, Gerhard; August, Peter; and Wick, Manfred, 4,177,341, Cl. 528-15.000.
Constable, Philip J.: *See*—
Turner, Roy C.; and Constable, Philip J., 4,177,423, Cl. 324-99.00R.
Consumers Glass Company Limited: *See*—
Mancini, Derek V., 4,176,507, Cl. 53-478.000.
Continental Group, Inc., The: *See*—
Roth, Donald J., 4,176,760, Cl. 220-359.000.
Control Electronics Co., Inc.: *See*—
Goldstein, Harold; and Montren, William T., 4,177,407, Cl. 315-312.000.
Cook, Brian: *See*—
Khan, Karrar A.; and Cook, Brian, 4,177,254, Cl. 424-16.000.
Cookson, Richard C.; and Ferro, Lorenzo D., to Bush Boake Allen Limited. 3,3,7,8-Tetramethyl-2-oxabicyclo-[4,4,0]-decane derivatives and their use in perfume compositions. 4,177,170, Cl. 252-522.000.
Cooper, Tallie B. Hammer device attachment. 4,176,541, Cl. 72-474.000.
Copal Company Limited: *See*—
Okabe, Katsuhiko, 4,176,599, Cl. 101-95.000.
Copeland, Thomas M.; Feinberg, Kenneth J.; and Vang, Alfred H. Plotting apparatus. 4,176,455, Cl. 33-1.00M.
Corcoran, Edward J., Jr. Coin actuated timer with audio output. 4,176,739, Cl. 194-9.00T.
Corkery, Gregory O., to Arundale, Inc. Process for improving impact resistance of rigid nylon articles and the articles produced therefrom. 4,176,816, Cl. 248-188.900.
Corno, Maria L.: *See*—
Doria, Gianfederico; Romeo, Ciriaco; Lauria, Francesco; Corno, Maria L.; Giraldi, Piernicola; and Tibolla, Marcello, 4,177,276, Cl. 424-263.000.
Doria, Gianfederico; Romeo, Giriaco; Lauria, Francesco; Corno, Maria L.; Giraldi, Piernicola; and Tibolla, Marcello, 4,177,286, Cl. 424-283.000.
Cosden Technology, Inc.: *See*—
Watson, James M., 4,177,110, Cl. 203-9.000.
Cousin Freres S.A.: *See*—
Cousin, Jacques V. L.; Decroix, Marcel E. R.; and Gouy, Hyppolite P., 4,176,735, Cl. 192-12.00D.
Cousin, Jacques V. L.; Decroix, Marcel E. R.; and Gouy, Hyppolite P., to Cousin Freres S.A. High-speed apparatus for off-winding thread. 4,176,735, Cl. 192-12.00D.
Covert, Garry C.: *See*—
Gaishin, Rudolph M.; and Covert, Garry C., 4,177,426, Cl. 325-37.000.
Covington, Wayne F.: *See*—
Olander, Emil E., Jr.; James, Rex L.; Larson, Ivar W.; Covington, Wayne F.; Walden, Jack M.; Watson, Robert E.; Yockey, Francis J.; Wenninger, Fred, Jr.; and Russell, Homer C., 4,177,518, Cl. 364-710.000.
Cox Foundry & Machine Co.: *See*—
Simmons, James W., Jr., 4,176,692, Cl. 139-21.000.
Cox, Howard W., to Mission Marketing Corporation of Arizona. Ventilating damper assembly. 4,176,587, Cl. 98-116.000.
Cox, Michael D.: *See*—
Noddings, John; and Cox, Michael D., 4,177,492, Cl. 361-31.000.
Coyle, Randy. Variable resistance exercising apparatus and method. 4,176,836, Cl. 272-120.000.
Cozine, Michael S., administrator: *See*—
Anderson, Harald, deceased; Anderson, Aelita, administrator; and Cozine, Michael S., administrator, 4,177,037, Cl. 8-149.000.
Cracraft, Julian L. Safety door holder. 4,176,870, Cl. 292-338.000.
Cragoe, Edward J., Jr.; and Woltersdorf, Otto W., Jr., to Merck & Co., Inc. [1-Oxo-2-thienyl-2-substituted-5-indanyloxy (or thio)]alkanoic acids and derivatives thereof. 4,177,285, Cl. 424-275.000.
Crane Co.: *See*—
Liberman, Richard, 4,176,675, Cl. 137-340.000.
Craven, Geoffrey F.: *See*—
Wallace, Walter M.; and Craven, Geoffrey F., 4,176,749, Cl. 209-457.000.
Creative Tool Specialties, Inc.: *See*—
Anderson, Rodney L., 4,176,585, Cl. 409-125.000.
Creusot-Loire: *See*—
Honnorat, Yves C.; Raisson, Gerard D.; and Morlet, Jean G., 4,177,026, Cl. 425-7.000.
Cromwell, John E.; Herbert, Nicholas; and Hyde, Glenn F., to Koppers Company, Inc. Method of making piston rings with chrome-filled grooves. 4,176,434, Cl. 29-156.630.
Crosby, Samuel C.: *See*—
Whitney, Thomas M.; and Crosby, Samuel C., 4,176,413, Cl. 4-300.000.
Crown Zellerbach: *See*—
Herschler, Robert J., 4,177,267, Cl. 424-238.000.
Crown Zellerbach Corporation: *See*—
Stollberg, Ray H., 4,176,745, Cl. 206-423.000.
Cudby, Joseph W.; King, Christopher F.; and Syred, Nicholas, to USS Engineers and Consultants, Inc. Fluted,-stepped, pour nozzle. 4,176,769, Cl. 222-591.000.
Culbert, Robert M.; and Raber, Robert R., Jr., to Farr Company. Air filter assembly. 4,177,050, Cl. 55-499.000.
Cummins Engine Company, Inc.: *See*—
Perr, Julius P., 4,176,641, Cl. 123-140.0FG.
Cunneen, Charles: *See*—
Davidson, Thomas; and Cunneen, Charles, 4,176,815, Cl. 248-589.000.
Cuntze, Ulrich: *See*—
Kleber, Rolf; and Cuntze, Ulrich, 4,177,231, Cl. 264-130.000.

Cyphelly, Ivan J. Hydrostatic torque measuring device for rotating shafts. 4,176,548, Cl. 73-136.00D.
D. H. Baldwin & Company: *See—*
Munch, Walter, 4,176,575, Cl. 84-1.010.
Dai Nippon Toryo Co., Ltd.: *See—*
Hayashi, Masaaki; Tsuneta, Kazuyoshi; Takada, Hiroshi; Kenmotsu, Nobuhiro; and Sasaki, Hiroharu, 4,177,174, Cl. 260-18.0PN.
Daicel LTD.: *See—*
Kishi, Kazuo; Hayashi, Minoru; and Naganuma, Kazuo, 4,176,607, Cl. 102-49.300.
Daikin Kogyo Co., Ltd.: *See—*
Yoshimura, Tatsushiro; Namba, Mutsusuke; Suzue, Seisuke; Tominaga, Shigetake; Mizuno, Toshio; and Hayashida, Nariyoshi, 4,177,320, Cl. 428-419.000.
Daimler-Benz Aktiengesellschaft: *See—*
Allert, Anton; Weiss, Friedrich; and Schrape, Peter, 4,176,562, Cl. 74-563.000.
Buchner, Helmut, 4,177,445, Cl. 338-34.000.
Schulz, Manfred; and Kappler, Gudrun, 4,176,877, Cl. 296-208.000.
Dal Bianco, Alberto, to Montedison S.p.A. Tubular reactor for the high pressure polymerization of alpha-olefines. 4,177,240, Cl. 422-115.000.
Dale, Warren H., to Hercules Incorporated. Apparatus and method for automated injection of trees with a treating liquid. 4,176,495, Cl. 47-57.500.
Dalibor, Horst, to Hoechst Aktiengeselischaft. Process for the preparation of coatings composed of polyhydroxy compounds. 4,177,183, Cl. 260-31.40R.
Danel, Francois, to Alsthom-Atlantique. Device for injection of a gas in a liquid. 4,177,226, Cl. 261-124.000.
Dangel, Jurgen: *See—*
Bischoff, Erich; Dangel, Jurgen; Schussler, Hans; Ricker, Thomas; and Stein, Erich, 4,176,442, Cl. 29-571.000.
Daniher, Francis A.; and Oswald, Alexis A., to Exxon Research & Engineering Co. Pesticidal use of N-chlorocrotyl acyl compositions. 4,177,289, Cl. 424-300.000.
Dannelly, Clarence C., to Eastman Kodak Company. Rumen-stable pellets. 4,177,255, Cl. 424-21.000.
Danon, David, to Yeda Research & Development Co. Ltd. Water container. 4,176,772, Cl. 224-148.000.
Darrow, John O. G., to Westinghouse Air Brake Company. Fail-safe acknowledging circuit. 4,177,459, Cl. 340-519.000.
Das, Suryya K.; and Kania, Charles M., to PPG Industries, Inc. Thermosetting acrylic copolymer compositions. 4,177,178, Cl. 260-29.40A.
Date, Nobuaki: *See—*
Kozuki, Susumu; Uchidoi, Masanori; Date, Nobuaki; Shimizu, Masami; Aizawa, Hiroshi; and Takishima, Yoshiyuki, 4,176,936, Cl. 354-38.000.
Davidson, Daniel F., to United Kingdom Atomic Energy Authority. Electromagnetic pumps. 4,177,015, Cl. 417-50.000.
Davidson, Donald R., to Singer Company, The. Low tolerance rotary to linear transmission. 4,176,561, Cl. 74-424.80A.
Davidson, Thomas; and Cunneen, Charles, to F & S Manufacturing Corporation. Variable spring hanger assembly. 4,176,815, Cl. 248-589.000.
Davies, George E.; and Janata, Jiri, to Imperial Chemical Industries Limited. Magnetic particles for immunoassay. 4,177,253, Cl. 424-1.000.
Davis, Jack W.: *See—*
Eckbreth, Alan C.; and Davis, Jack W., 4,176,960, Cl. 356-338.000.
Davis, Robert E.: *See—*
Rhodes, Donald E.; Baldwin, Roger A.; and Davis, Robert E., 4,177,134, Cl. 208-177.000.
Davis, William F., to Motorola, Inc. Monolithic current supplies having high output impedances. 4,177,416, Cl. 323-4.000.
Davy-Loewy Limited: *See—*
Barber, Bernard H., 4,176,540, Cl. 72-201.000.
Day, Henry, to Concrete Industries (Monier) Limited. Coating uncured cementitious surfaces. 4,177,232, Cl. 264-133.000.
Day, Joseph G., to Johnson, Matthey & Co., Limited. Production of yttrium. 4,177,059, Cl. 75-10.00R.
DBX Inc.: *See—*
Jaeger, C. Rene; and Blakely, Lawrence E., 4,177,356, Cl. 179-1.0VL.
DeBoskey, Wentzle R.; and Sebrosky, Robert A., to International Business Machines Corporation. Metalloid filament wire matrix print head. 4,176,975, Cl. 400-124.000.
De Brabandere, Luc A.; Borginon, Hendrik A.; Pattyn, Herman A.; and Pollet, Robert J., to Agfa-Gevaert, N.V. Rapidly processable radiographic materials. 4,177,071, Cl. 430-494.000.
DeBruyne, Patrick; and Sittig, Roland, to BBC Brown Boveri & Company. Electrical circuit with a high-frequency thyristor fired by blocking leakage current. 4,177,479, Cl. 357-38.000.
DeColibus, Raymond L., to Du Pont de Nemours, E. I., and Company. Titanium dioxide pigment slurries to impart high gloss to water-based acrylic paint systems. 4,177,081, Cl. 106-300.000.
Decroix, Marcel E. R.: *See—*
Cousin, Jacques V. L.; Decroix, Marcel E. R.; and Gouy, Hyppolite P., 4,176,735, Cl. 192-12.00D.
Deere & Company: *See—*
Diehl, William K., 4,176,682, Cl. 137-533.110.
Shipinski, John H., 4,176,642, Cl. 123-140.00R.
Deficis, Alain; Gimonet, Marie-Edith; Priou, Alain; and Fournet-Fayas, Christian, to Agence Nationale de Valorisation de la Recherche (A.N.V.A.R.). Apparatus and process for generating an ionized gas or plasma by microwave energy. 4,177,422, Cl. 324-95.000.
Deigner, Paul: *See—*
Schoenafinger, Eduard; Deigner, Paul; Koester, Eberhard; Ohlinger, Manfred; Schaefer, Dieter; Stumpfi, Werner; Amort, Juergen; Seiler, Claus-Dietrich; Nestler, Heinz; and Ambros, Otto, 4,177,317, Cl. 428-405.000.
de Launay, Paul. Check valve. 4,176,680, Cl. 137-496.000.
Del Bo, Vittorio: *See—*
Iannuzzi, Giulio; deMartiis, Carlo C.; Del Bo, Vittorio; and Gandolfi, Luciano, 4,176,443, Cl. 29-589.000.
DeLuca, Raymond F., to Georgia-Pacific Corporation. Multiple wound roll dispenser for flexible sheet material. 4,176,569, Cl. 83-337.000.
DEMAG Aktiengesellschaft: *See—*
Elsner, Wolfgang; Kalter, Werner; Michel, Rolf; and Moslener, Jorn, 4,176,535, Cl. 72-10.000.
deMartiis, Carlo C.: *See—*
Iannuzzi, Giulio; deMartiis, Carlo C.; Del Bo, Vittorio; and Gandolfi, Luciano, 4,176,443, Cl. 29-589.000.
Demer, Joseph: *See—*
Mylrea, Kenneth C.; and Demer, Joseph, 4,176,660, Cl. 128-671.000.
de Montigny, Armand; and Moretto, Hans-Heinrich, to Bayer Aktiengesellschaft. Preparation of silicon-functional polyorganosiloxanes. 4,177,201, Cl. 260-448.20E.
Denney, Jon F. Combined clip and quick release key. 4,176,534, Cl. 70-408.000.
Denny, Patrick J.; Harrison, David L.; and Stacey, Martyn H., to Imperial Chemical Industries Limited. Catalyst bed for use in a catalytic flameless heater device. 4,177,168, Cl. 252-470.000.
DeNora, Oronzio; and Pellegri, Alberto, to Oronzio DeNora Implanti Elettrochimici S.p.A. Electrolytic cell with membrane and method of operation. 4,177,116, Cl. 204-98.000.
de Polo, Harry R. Garments formed of helically coiled pieces. 4,176,408, Cl. 2-69.000.
de Rivet, Philippe-Hubert: *See—*
Appell, Marc; Lepicard, Georges; de Rivet, Philippe-Hubert; Bradley, John J.; and Franklin, Benjamin S., 4,177,510, Cl. 364-200.000.
Deutsch, Ralph, to Kawai Musical Instrument Mfg. Co. Ltd. Intrakeyboard coupling and transposition control for a keyboard musical instrument. 4,176,573, Cl. 84-1.010.
Deuzer Maschinenfabrik GmbH: *See—*
Honig, Helmut, 4,177,371, Cl. 219-59.100.
Devanney, Mary T. Numbers teaching aid. 4,176,472, Cl. 35-32.000.
DeWitt, Leslie, Jr. Aerodynamic throwing disc. 4,176,843, Cl. 273-106.00B.
Dey, Arabinda N.; Miller, John S.; and Bowden, William L., to P. R. Mallory & Co. Inc. Electrolyte salts for non aqueous electrochemical cells. 4,177,329, Cl. 429-101.000.
Diamond Shamrock Corporation: *See—*
Carr, Brian J., 4,177,173, Cl. 260-18.0EP.
Schwartz, Joel; and Fleming, Joseph P., 4,177,243, Cl. 423-167.000.
Diaz, Stephen H., to Raychem Corporation. Heating elements comprising conductive polymers capable of dimensional change. 4,177,446, Cl. 338-212.000.
Dickerson, Delbert J., to Dickerson, Donald R. Automatic shutoff liquid dispensing valve. 4,176,694, Cl. 141-95.000.
Dickerson, Donald R.: *See—*
Dickerson, Delbert J., 4,176,694, Cl. 141-95.000.
Dickerson, Evelyn C.; and Jones, Ronald B. Lounge with articulated side-by-side independently adjustable longitudinal sections. 4,176,415, Cl. 5-66.000.
Dickson, Eric W., to Glacier Metal Company Limited, The. Method and apparatus for reducing metal oxide. 4,177,063, Cl. 75-62.000.
Dideriksen, Erling T., to Interlego A.G. Rotatable element for toy building sets. 4,176,493, Cl. 46-23.000.
Diegelmann, Winfried; Schardt, Gunter; Klatt, Jochen; and Grolz, Heinz, to Schunk & Ebe GmbH. Impregnated carbon brush for electrical machinery. 4,177,316, Cl. 428-367.000.
Diehl, William K., to Deere & Company. Check valve ball stop clip. 4,176,682, Cl. 137-533.110.
Diemert, Paul M.: *See—*
Reed, Frank A., deceased; and Diemert, Paul M., executor, 4,176,987, Cl. 406-10.000.
Diemert, Paul M., executor: *See—*
Reed, Frank A., deceased; and Diemert, Paul M., executor, 4,176,987, Cl. 406-10.000.
Dieterich, Dieter: *See—*
Scholl, Hans-Joachim; and Dieterich, Dieter, 4,177,206, Cl. 260-456.00P.
Dietze, Gunther; and Wicklmayr, Matthias, to Thera Gesellschaft fur Patentverwertung mbH. Pharmaceutical composition and method of stimulating blood circulation and wound healing. 4,177,261, Cl. 424-101.000.
Dill, Terry A., to Jefferson Industries Company, The. Pig confinement stall assembly. 4,176,621, Cl. 119-20.000.
Dillard, James G., to Edge Saw Manufacturing Co. Adjustable apparatus for producing a foam material. 4,177,028, Cl. 425-89.000.
Divins, Larry A.; and Short, Larry E., to General Electric Company. Apparatus and process for recovering nuclear fuel from scrap material. 4,177,241, Cl. 423-20.000.
Dixon, Howard D.: *See—*
Harvey, Kenneth L.; and Dixon, Howard D., 4,177,227, Cl. 264-3.00R.

Dixon, Jack B. Burner tip drag guide. 4,176,829, Cl. 266-66.000.
Dixon, Richard W.; and Svacek, Joseph F., III, to Bell Telephone Laboratories, Incorporated. Circuit for controlling the differential output power of a semiconductor laser. 4,177,436, Cl. 331-94.50S.
Dominion Foundries and Steel, Limited: *See—*
Clipston, Robert H.; Hall, Emerson O.; and Ng, Hon-Hei F., 4,177,303, Cl. 427-259.000.
Doorakian, George A.; and Duquette, Lawrence G., to Dow Chemical Company, The. Novel tributyl (2,5-dihydroxyphenyl)phosphonium hydroxide inner salts. 4,177,216, Cl. 260-606.50F.
Doria, Gianfederico; Romeo, Ciriaco; Lauria, Francesco; Corno, Maria L.; Giraldi, Piernicola; and Tibolla, Marcello, to Farmitalia Carlo Erba, S.p.A. Substituted 2-vinyl-chromones and process for their preparation. 4,177,276, Cl. 424-263.000.
Doria, Gianfederico; Romeo, Giriaco; Lauria, Francesco; Corno, Maria L.; Giraldi, Piernicola; and Tibolla, Marcello, to Farmitalia Carlo Erba, S.p.A. Substituted 2-vinyl-chromones and process for their preparation. 4,177,286, Cl. 424-283.000.
Dorman, Richard A., to Mechanical Technology Incorporated. Signal amplifier system for controlled carrier signal measuring sensor/transducer of the variable impedance type. 4,176,555, Cl. 73-658.000.
Dotson, Ronald L.; and Lynch, Richard W., to Olin Corporation. Electrochemical production of organic hypohalite compounds in an undivided cell. 4,177,115, Cl. 204-78.000.
Dougan, Roger W.: *See—*
Tucker, James M.; Dougan, Roger W.; and Swartzon, Jackob, 4,176,525, Cl. 62-238.00R.
Douglas, Homer C., to Cable Caddy, Inc. Support device for cable drums. 4,176,801, Cl. 242-54.00R.
Dovertie, Ralph G.: *See—*
Otteblad, Sven I. A.; Brynielsson, Erner T. O.; Dovertie, Ralph G.; Franzen, Stig E. R.; and Brelen, Hans E. O., 4,176,728, Cl. 180-168.000.
Dow Chemical Company, The: *See—*
Doorakian, George A.; and Duquette, Lawrence G., 4,177,216, Cl. 260-606.50F.
Pannell, Calvin E., 4,177,343, Cl. 528-482.000.
Vanderkooi, William N.; and Jewett, Gary L., 4,177,210, Cl. 260-561.00N.
Dow Corning Corporation: *See—*
Baney, Ronald H.; and Harris, Len A., 4,177,175, Cl. 260-29.20M.
Homan, Gary R.; and Lee, Chi-Long, 4,177,322, Cl. 428-447.000.
Dow Corning Limited: *See—*
Burrill, Peter M.; and Rankin, Frank S., 4,177,176, Cl. 260-29.20M.
Dow, Walter K. Novel windshield visor support and adapter. 4,176,875, Cl. 296-97.00K.
Dowd, Daniel J., to Westvaco Corporation. Stretchable material rewinding machine. 4,177,410, Cl. 318-163.000.
Down, Clive L. C., to Avon Industrial Polymers (Melksham) Limited. Attachment of hovercraft fingers. 4,176,729, Cl. 180-127.000.
Doyle, Charles E., Jr. Skewer. 4,176,592, Cl. 99-419.000.
Drayton Controls (Engineering) Limited: *See—*
Turner, Roy C.; and Constable, Philip J., 4,177,423, Cl. 324-99.00R.
Dresser Industries, Inc.: *See—*
Lafuze, David S., 4,176,848, Cl. 277-92.000.
Shields, Santos, 4,176,725, Cl. 175-374.000.
Wetterhorn, Richard H., 4,176,558, Cl. 73-741.000.
Drevitch, Nolan A.: *See—*
Young, Warren H.; Drevitch, Nolan A.; and Rosati, Anthony G., 4,176,932, Cl. 354-126.000.
Drica-Minieris, Oswald A.: *See—*
Russell, C. Paul; Gingo, Joseph M.; and Drica-Minieris, Oswald A., 4,176,705, Cl. 152-359.000.
DTL, Incorporated: *See—*
Arceneaux, Leonce, 4,176,723, Cl. 175-329.000.
Dual Gebruder Steidenger: *See—*
Broghammer, Werner, 4,177,490, Cl. 360-105.000.
Dubroc, Tyrone P., Sr. Carrier for three-wheel motorcycle. 4,176,771, Cl. 224-39.000.
Dubuit, Jean-Louis. Printing machines and transfer devices therefor. 4,176,598, Cl. 101-38.00A.
Duerkop, Joachim: *See—*
Selden, Peter H.; Duerkop, Joachim; Albrecht, Wolfgang; and Weissenmayer, Heinz, 4,177,032, Cl. 425-468.000.
Dufour, Paul: *See—*
Vrancken, August; and Dufour, Paul, 4,177,338, Cl. 526-211.000.
Duggins, Richard W.; and Rodgers, James W., to Frameworks, Inc. Picture frame mat opening cutter. 4,176,452, Cl. 30-293.000.
Dumont, Claude: *See—*
Nedelec, Lucien; Frechet, Daniel; Dumont, Claude; and Hunt, Peter, 4,177,292, Cl. 424-330.000.
Dunbar, David R.; and Balog, Edward J., Sr., to Interpace Corporation. Shear bolt assembly for a load limiting line support for a post insulator. 4,177,352, Cl. 174-1.000.
Dunlop Limited: *See—*
Young, Maurice A.; and Hamacher, Leonhard W., 4,176,513, Cl. 57-237.000.
Dunn, Christopher H. Distance measuring apparatus. 4,176,458, Cl. 33-141.00E.
Dunn, Larry P.: *See—*
Bate, Geoffrey; and Dunn, Larry P., 4,177,442, Cl. 335-284.000.
Du Pont de Nemours, E. I., and Company: *See—*
Arhart, Richard J.; and Nersasian, Arthur, 4,177,223, Cl. 525-331.000.
Bingham, Richard C., 4,177,195, Cl. 260-343.210.
DeColibus, Raymond L., 4,177,081, Cl. 106-300.000.
Hazan, Isidor, 4,177,124, Cl. 204-181.00C.
Ida, Edward S., 4,177,434, Cl. 331-27.000.
Proskow, Stephen, 4,177,074, Cl. 430-286.000.
Seidel, William C., 4,177,215, Cl. 260-606.50B.
Ubersax, Richard W., 4,177,315, Cl. 428-336.000.
Duquette, Lawrence G.: *See—*
Doorakian, George A.; and Duquette, Lawrence G., 4,177,216, Cl. 260-606.50F.
Durrum, Emmett L., to Eldex Laboratories, Incorporated. Data recording apparatus. 4,177,470, Cl. 346-139.00R.
Dynair Limited: *See—*
Elmer, Arthur E. H., 4,176,630, Cl. 123-41.120.
Dynamit Nobel Aktiengesellschaft: *See—*
Neidhardt, Manfred; and Rehfeld, Gerhard, 4,177,235, Cl. 264-140.000.
E M I Limited: *See—*
Hounsfield, Godfrey N., 4,177,382, Cl. 250-445.00T.
E. R. Squibb & Sons, Inc.: *See—*
Michel, Gerd W.; and Fralick, Elizabeth A., 4,177,265, Cl. 424-181.000.
Ondetti, Miguel A.; and Condon, Michael E., 4,177,277, Cl. 424-263.000.
Wade, Peter C.; Vogt, B. Richard; and Kissick, Thomas P., 4,177,191, Cl. 548-212.000.
Eadie, David W.; and Hancock, Charles J., to Quest Automation Limited. Optical projection apparatus. 4,176,926, Cl. 354-4.000.
Eagen, Roger D.; and Vogel, Clarence E. Apparatus for printing a label on a web. 4,176,604, Cl. 101-328.000.
Easterling, Jimmy W. Illuminated bar for an advertising sign. 4,177,506, Cl. 362-414.000.
Eastman Kodak Company: *See—*
Dannelly, Clarence C., 4,177,255, Cl. 424-21.000.
Henry, James W., 4,177,482, Cl. 358-93.000.
Holzhauser, Ronald C.; Zirngibl, Carl H.; and O'Brien, Vincent J., 4,176,945, Cl. 355-23.000.
Eaton Corporation: *See—*
Keranen, John J., 4,177,363, Cl. 200-5.00B.
Richards, Elmer A.; and Roberts, Carl D., 4,176,736, Cl. 192-53.00F.
Ebara, Katsuya: *See—*
Mastuzaki, Harumi; Ebara, Katsuya; and Takahashi, Sankichi, 4,177,138, Cl. 210-22.00C.
Ebco Industries, Ltd.: *See—*
Eppich, Helmut, 4,176,783, Cl. 235-474.000.
Eckbreth, Alan C.; and Davis, Jack W., to United Technologies Corporation. Spatial resolution enhancement in coaxial light scattering systems. 4,176,960, Cl. 356-338.000.
Ecodyne Corporation: *See—*
Halbfoster, Christopher J., 4,177,142, Cl. 210-75.000.
Ecolotrol, Inc.: *See—*
Hickey, Robert F.; and Owens, Roger W., 4,177,144, Cl. 210-86.000.
Economy Engine Company, The: *See—*
Beeghly, Bruce R., 4,176,643, Cl. 123-146.50A.
Edge Saw Manufacturing Co.: *See—*
Dillard, James G., 4,177,028, Cl. 425-89.000.
Egli, Henry O. Hinged tool holder. 4,176,991, Cl. 408-239.00R.
Eguchi, Ronald G., to Northrop Corporation. Arc detector for glow discharges. 4,177,404, Cl. 315-151.000.
Eichinger, Johann, to Carl Hurth Maschinen- und Zahnradfabrik. Hydraulic rigging device. 4,176,549, Cl. 73-162.000.
Eickel, Rolf; and Rheude, Alfred, to Agfa-Gevaert Aktiengesellschaft. Method and apparatus for making and developing ionographic images of X-rayed objects. 4,177,380, Cl. 250-315.200.
Eisenmann, Siegfried; and Harle, Hermann, to Furstlich Hohenzollernsche Huttenverwaltung Laucherthal. High-pressure rotary fluid-displacing machine. 4,177,025, Cl. 418-133.000.
El-Aasser, Mohamed S.: *See—*
Vanderhoff, John W.; El-Aasser, Mohamed S.; and Ugelstad, John, 4,177,177, Cl. 260-29.20M.
Eldex Laboratories, Incorporated: *See—*
Durrum, Emmett L., 4,177,470, Cl. 346-139.00R.
Electric Power Research Institute: *See—*
Younger, Francis C., 4,176,563, Cl. 74-572.000.
Elmer, Arthur E. H., to Dynair Limited. Automatic control valves. 4,176,630, Cl. 123-41.120.
Elsner, Wolfgang; Kalter, Werner; Michel, Rolf; and Moslener, Jorn, to DEMAG Aktiengesellschaft. Apparatus for cropping, dividing and reducing rolled material at high speed. 4,176,535, Cl. 72-10.000.
Energy Conversion Devices, Inc.: *See—*
Ovshinsky, Stanford R., 4,177,473, Cl. 357-2.000.
Ovshinsky, Stanford R., 4,177,474, Cl. 357-2.000.
Engels, John P.: *See—*
Lundvall, Donald O., I; Engels, John P.; and Yesconis, Robert R., 4,177,465, Cl. 343-112.00D.
Ensign, Harold W., to Cla-Val Co. Hollow spool valve. 4,176,687, Cl. 137-625.650.
Entzmann, Karl; Kalman, Gyorgy; Varga, Janos; Vecsei, Miklos; Jankovics, Gabor; and Kozicz, Laszlone. Process for preparing dicalcium phosphate containing fertilizer. 4,177,052, Cl. 71-33.000.
Eppich, Helmut, to Ebco Industries, Ltd. Manually operable card reader including column sensor. 4,176,783, Cl. 235-474.000.
Erickson, James A., to Boltswitch, Inc. Switch operating rod assembly. 4,177,368, Cl. 200-332.000.
Eriksson, Ake; and Norin, Ake, to Primus-Sievert AB. Apparatus for waxing skis. 4,176,657, Cl. 126-401.000.

Eriksson, Bertil T.: *See—*
Albrektsson, Kjell A.; Eriksson, Bertil T.; Eriksson, Sven W.; Franzen, Hans A. E.; and Sandlin, Rolf H., 4,176,814, Cl. 244-3.150.
Eriksson, Sven W.: *See—*
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Ernst Leitz Wetzlar GmbH: *See—*
Knittel, Siegfried, 4,177,424, Cl. 324-102.000.
Ernst Muller KG.: *See—*
Borberg, Hartmut, 4,176,672, Cl. 137-99.000.
Ernster, Peter J.; Schaefer, George H.; and Neal, Michael G., to Sunbeam Corporation. Multi-purpose kitchen appliance. 4,176,971, Cl. 366-298.000.
Erwien, Helmut; and Karsten, Werner, to Gewerkschaft Eisenhutte Westfalia. Anchoring apparatus for a mining installation. 4,176,884, Cl. 299-34.000.
Eskesen, John H.; and Leibowitz, Herman M., to General Electric Company. Bar for sealing the gap between adjacent shroud plates in liquid-cooled gas turbine. 4,177,011, Cl. 416-191.000.
Espenscheid, Wilton F., to Mobil Oil Corporation. Asphaltic paving compositions and method of preparation from solid organic wastes. 4,177,079, Cl. 106-274.000.
Esselborn, Eberhard: *See—*
Schamberg, Eckehard; Fock, Jurgen; Klocker, Otto; and Esselborn, Eberhard, 4,177,221, Cl. 525-244.000.
Essex Group, Inc.: *See—*
Willeke, Steven A., 4,177,443, Cl. 337-101.000.
Essilor International (Compagnie Generale d'Optique): *See—*
Bardonnet, Pierre; and Chamberaud, Jean-Rene, 4,176,501, Cl. 51-277.000.
Estrella, Carlos A.: *See—*
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Etat Francais as represented by the Pelegue General pour l'Armement: *See—*
Robert, Andre J.; Bourdon, Claude G.; Msika, Nessim C.; Chorlay, Etienne G.; and Euzenade, Jean-Louis, 4,176,951, Cl. 356-33.000.
Eue, Ludwig: *See—*
Seng, Florin; Sasse, Klaus; Beck, Gunther; Eue, Ludwig; and Schmidt, Robert R., 4,177,055, Cl. 71-92.000.
Euzarraga, Rosendo; Winkler, Robert J.; and Chapman, Robert D., to Solomon, Fred F. Poster supporting frame. 4,176,480, Cl. 40-155.000.
Euzenade, Jean-Louis: *See—*
Robert, Andre J.; Bourdon, Claude G.; Msika, Nessim C.; Chorlay, Etienne G.; and Euzenade, Jean-Louis, 4,176,951, Cl. 356-33.000.
Evans Products Company: *See—*
Ridenour, Michael R., 4,176,784, Cl. 236-86.000.
Evans, Ralph M., to Evans Rotork, Inc. Method and apparatus for laminating panels. 4,177,101, Cl. 156-300.000.
Evans Rotork, Inc.: *See—*
Evans, Ralph M., 4,177,101, Cl. 156-300.000.
Everest & Jennings, Inc.: *See—*
Rodaway, Keith S., 4,176,879, Cl. 297-429.000.
Everett/Charles, Inc.: *See—*
Hines, Clyde K.; Long, Everett J.; and Muench, Elmer W., 4,176,900, Cl. 339-75.0MP.
Everitt, Allen D., to Allen D. Everitt Knitting Company. Knit cap with multiple layer construction and process of making same. 4,176,409, Cl. 2-173.000.
Exxon Production Research Company: *See—*
Taft, Daniel G.; and Heilhecker, Joe K., 4,176,986, Cl. 405-211.000.
Exxon Research & Engineering Co.: *See—*
Daniher, Francis A.; and Oswald, Alexis A., 4,177,289, Cl. 424-300.000.
Feng, Tom; and Ghosh, Amal K., 4,177,093, Cl. 148-174.000.
Eyles, Martin K.; and Wagner, Graham L., to British Petroleum Company Limited, The. Method for determining fouling. 4,176,544, Cl. 73-61.200.
F. D. Farnam Co.: *See—*
Cole, James D., 4,176,637, Cl. 123-119.00E.
F & S Manufacturing Corporation: *See—*
Davidson, Thomas; and Cunneen, Charles, 4,176,815, Cl. 248-589.000.
Fabinski, Walter; and Faulhaber, Reimar, to Hartman & Braun AG. Device for determining the nitrogen oxide concentration in a gaseous mixture. 4,176,963, Cl. 356-418.000.
Farden, Arne. Compact unit for excavating, compacting and loading. 4,176,477, Cl. 37-104.000.
Farel, Charles A.: *See—*
Brueckner, Karl H.; Farel, Charles A.; and Irsik, Johnnie F., 4,177,418, Cl. 323-56.000.
Farmitalia Carlo Erba, S.p.A.: *See—*
Doria, Gianfederico; Romeo, Ciriaco; Lauria, Francesco; Corno, Maria L.; Giraldi, Piernicola; and Tibolla, Marcello, 4,177,276, Cl. 424-263.000.
Doria, Gianfederico; Romeo, Giriaco; Lauria, Francesco; Corno, Maria L.; Giraldi, Piernicola; and Tibolla, Marcello, 4,177,286, Cl. 424-283.000.
Farr Company: *See—*
Culbert, Robert M.; and Raber, Robert R., Jr., 4,177,050, Cl. 55-499.000.
Farrar, Peter G. G.: *See—*
Patterson, James; and Farrar, Peter G. G., 4,177,013, Cl. 416-193.00A.
Fattore, Vittorio: *See—*
Manara, Giovanni; Notari, Bruno; and Fattore, Vittorio, 4,177,167, Cl. 252-455.00R.
Faulhaber, Reimar: *See—*
Fabinski, Walter; and Faulhaber, Reimar, 4,176,963, Cl. 356-418.000.
Faust, Clifford C.: *See—*
Mettler, Mark F.; Faust, Clifford C.; Loichinger, Brant A.; and Forrest, Walter T., 4,176,700, Cl. 150-3.000.
Fauth, Gunter: *See—*
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Fearing, Ralph B.: *See—*
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Feddersen, Phyllis A., to General Dynamics Corporation. Dry film screen stencil and method of making. 4,176,602, Cl. 430-308.000.
Fedorovsky, Boris B.: *See—*
Paton, Boris E.; Medovar, Boris I.; Tsukanov, Georgy E.; Bogachenko, Alexei G.; Artamonov, Viktor L.; Timashov, Grigory A.; Shtanko, Jury P.; Marchenko, Alexandr M.; Fedorovsky, Boris B.; Kumysh, Ilya I.; Chepurnoi, Anatoly D.; Saenko, Vladimir Y.; and Semin-Vadov, Gennady M., 4,177,058, Cl. 75-10.00C.
Feinberg, Kenneth J.: *See—*
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Feingold, David A.; and Feingold, Susan R. Wall hanging. 4,177,305, Cl. 428-13.000.
Feingold, Susan R.: *See—*
Feingold, David A.; and Feingold, Susan R., 4,177,305, Cl. 428-13.000.
Feinstein, Allen I.; Bertolacini, Ralph J.; and Kim, Dae K., to Standard Oil Company (Indiana). Process for selective ethyl scission of ethylaromatics to methylaromatics. 4,177,219, Cl. 585-489.000.
Felix, Pierre, to Thomson-CSF. Process and arrangement for reconstituting the thermal flux absorbed by a pyroelectric target. 4,177,483, Cl. 358-113.000.
Feltgen, Karlheinz: *See—*
Pieper, Christian; Sandhu, Surinder S.; Schummer, Gunter; and Feltgen, Karlheinz, 4,177,111, Cl. 203-14.000.
Felton, Dale D.; and Jones, William R., to Armco Steel Corporation. Coupling for pipe. 4,176,865, Cl. 285-373.000.
Fencl, Zdenek: *See—*
Kubanek, Vladimir; Basarova, Gabriela; Kralicek, Jaroslav; Skach, Josef; Fencl, Zdenek; Budin, Jiri; Kondelikova, Jaroslava; and Sittler, Eduard, 4,177,295, Cl. 426-330.300.
Feng, Tom; and Ghosh, Amal K., to Exxon Research & Engineering Co. Method of fabricating conducting oxide-silicon solar cells utilizing electron beam sublimation and deposition of the oxide. 4,177,093, Cl. 148-174.000.
Ferguson, John R.: *See—*
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Ferro, Lorenzo D.: *See—*
Cookson, Richard C.; and Ferro, Lorenzo D., 4,177,170, Cl. 252-522.000.
Fex, Hans; Hansen, Bertil; Holmberg, Krister; Hogberg, Bertil; and Konyves, Imre, to Aktiebolaget Leo. Novel 17-esters of 17α-hydroxy gestogens, compositions containing such compounds, processes for their preparation and methods of treatment therewith. 4,177,269, Cl. 424-243.000.
Fiat Societa per Azioni: *See—*
Cattaneo, Maurizio; and Masoero, Renzo, 4,176,791, Cl. 239-76.000.
Fiber Controls Corporation: *See—*
Wise, Cecil S., 4,176,995, Cl. 414-266.000.
Fiber Industries, Inc.: *See—*
Knox, Lee H.; Owens, Malcolm P.; and Ure, George R., 4,176,711, Cl. 165-105.000.
Knox, Lee H.; and Owens, Malcolm P., 4,176,712, Cl. 165-105.000.
Fiedler, Howard C., to General Electric Company. Method of producing silicon-iron sheet material, and product. 4,177,091, Cl. 148-111.000.
Finsterwalder, Kurt: *See—*
Panknin, Walter; Finsterwalder, Kurt; Kannegiesser, Reinhard; and Bassler, Hans, 4,176,536, Cl. 72-91.000.
Fiore, Joseph V.; and Slanski, John M., to AMF Incorporated. Novel reconstituted tobacco sheets and process. 4,176,668, Cl. 131-17.00A.
Fiorentzis, Michael, to BBC Brown Boveri & Company Ltd. Test apparatus for checking the response of protective relays. 4,177,419, Cl. 324-418.000.
Firestone Tire & Rubber Company, The: *See—*
Roberts, Durward T., Jr., 4,177,233, Cl. 264-134.000.
Fischer, Artur. Connecting element. 4,176,505, Cl. 52-582.000.
Fisher, Helmut. Plate-type heat exchanger. 4,176,713, Cl. 165-166.000.
Fitzpatrick, Thomas J. Portable desk top tray. 4,176,743, Cl. 206-214.000.
Fleisher, Harold; and Hong, Se J., to International Business Machines Corporation. Array device for data scrambling. 4,177,355, Cl. 178-22.000.
Fleissner, Hans, to Vepa AG. Apparatus for the wet treatment of tension-free guided material. 4,176,531, Cl. 68-3.0SS.
Fleming, Joseph P.: *See—*
Schwartz, Joel; and Fleming, Joseph P., 4,177,243, Cl. 423-167.000.
Fletcher, Thomas A.: *See—*
Henderson, Alfred J., Jr.; and Fletcher, Thomas A., 4,177,504, Cl. 362-282.000.

Flo Dri Company: *See—*
Haslett, John A., Jr., 4,177,049, Cl. 55-483.000.
Florjancic, Dusan; and Matthias, Heinz-Bernd, to Klein, Schanzlin & Becker Aktiengesellschaft. Centrifugal pump. 4,177,008, Cl. 415-206.000.
FMC Corporation: *See—*
Broadway, William W., 4,176,820, Cl. 251-317.000.
Scudder, Roy; and Bowes, Alan, 4,176,511, Cl. 56-330.000.
Sommers, Richard J., 4,176,984, Cl. 405-81.000.
Fock, Jurgen: *See—*
Schamberg, Eckehard; Fock, Jurgen; Klocker, Otto; and Esselborn, Eberhard, 4,177,221, Cl. 525-244.000.
Ford Motor Company: *See—*
Wood, Tony J., 4,176,553, Cl. 73-304.00C.
Forman, Ladislav; Pech, Zdenek; and Vondruska, Vaclav, to Mlekarensky prumysl, generalni reditelstvi. Process of manufacture of a butter spread. 4,177,293, Cl. 426-43.000.
Forrest, Walter T.: *See—*
Mettler, Mark F.; Faust, Clifford C.; Loichinger, Brant A.; and Forrest, Walter T., 4,176,700, Cl. 150-3.000.
Forster, Gerhard, to RCA Corporation. Drive circuit for a television deflection output transistor. 4,177,393, Cl. 307-270.000.
Fortune, William S. Soldering tool holder. 4,176,778, Cl. 228-57.000.
Fosner, Emerson O.; and Post, Vernon L., to Fosner, Emerson O. Educational reinforcement apparatus. 4,176,470, Cl. 35-22.00A.
Foster Wheeler Energy Corporation: *See—*
Balakrishnan, Ramachandran; and Skinner, Geoffrey F., 4,177,068, Cl. 75-105.000.
Fournet-Fayas, Christian: *See—*
Deficis, Alain; Gimonet, Marie-Edith; Priou, Alain; and Fournet-Fayas, Christian, 4,177,422, Cl. 324-95.000.
Fowler, Eugene W., to Gene Fowler and Friends Inc. Street address locating aid. 4,176,860, Cl. 283-34.000.
Fralick, Elizabeth A.: *See—*
Michel, Gerd W.; and Fralick, Elizabeth A., 4,177,265, Cl. 424-181.000.
Fram Corporation: *See—*
Charles, Herbert N., 4,177,012, Cl. 416-132.00A.
Frameworks, Inc.: *See—*
Duggins, Richard W.; and Rodgers, James W., 4,176,452, Cl. 30-293.000.
Franche, Darius C., IV. Dog food dispenser. 4,176,767, Cl. 222-243.000.
Frank, Lowell C.: *See—*
Welna, Walton W.; and Frank, Lowell C., 4,177,078, Cl. 106-67.000.
Franke, John M., to United States of America, National Aeronautics and Space Administration. Laser Doppler velocity simulator. 4,176,950, Cl. 356-28.000.
Franke, Walter. Internal combustion engine. 4,176,632, Cl. 123-75.00B.
Franklin, Benjamin S.: *See—*
Appell, Marc; Lepicard, Georges; de Rivet, Philippe-Hubert; Bradley, John J.; and Franklin, Benjamin S., 4,177,510, Cl. 364-200.000.
Franks, Neal E., to Akzona Inc. Process for producing regenerated cellulose containing cross linked sodium lignate or sodium lignosulfonate. 4,177,236, Cl. 264-187.000.
Franzen, Hans A. E.: *See—*
Albrektsson, Kjell A.; Eriksson, Bertil T.; Eriksson, Sven W.; Franzen, Hans A. E.; and Sandlin, Rolf H., 4,176,814, Cl. 244-3.150.
Franzen, Stig E. R.: *See—*
Otteblad, Sven I. A.; Brynielsson, Erner T. O.; Dovertie, Ralph G.; Franzen, Stig E. R.; and Brelen, Hans E. O., 4,176,728, Cl. 180-168.000.
Frazee, Ralph E., Jr.; and Smithgall, David H., Sr., to Western Electric Co., Inc. Methods and apparatus for improving the resolution of measured parameters. 4,176,961, Cl. 356-355.000.
Frazer, Robert E., to United States of America, National Aeronautics and Space Administration. Apparatus for endoscopic examination. 4,176,662, Cl. 128-6.000.
Frechet, Daniel: *See—*
Nedelec, Lucien; Frechet, Daniel; Dumont, Claude; and Hunt, Peter, 4,177,292, Cl. 424-330.000.
Freiter, Gerhard, to U.S. Philips Corporation. Actuating mechanism for a record changer with a stacking spindle. 4,176,846, Cl. 274-10.00S.
Freudlsperger, Hans: *See—*
Gansauge, Jost; Muschi, Johann; and Freudlsperger, Hans, 4,176,710, Cl. 165-104.00F.
Fridman, Vladimir M.: *See—*
Zagorodnaya, Galina A.; Vartanian, Gurgen P.; Khutoretsky, Garri M.; and Fridman, Vladimir M., 4,177,398, Cl. 310-270.000.
Fritts, Rex E., to Amana Refrigeration, Inc. Digitally programmed microwave oven. 4,177,369, Cl. 219-10.55B.
Fritz, Adolf: *See—*
Hellberg, Rainer; Steinke, Leo; and Fritz, Adolf, 4,176,644, Cl. 123-148.00E.
Frohbieter, Edwin H., to Whirlpool Corporation. Conveyor belt for ice dispenser. 4,176,528, Cl. 62-344.000.
Fuji Jukogyo Kabushiki Kaisha: *See—*
Mori, Haruo, 4,176,636, Cl. 123-119.00A.
Fuji Kogyo Co., Ltd.: *See—*
Ohmura, Ryuichi, 4,176,488, Cl. 43-24.000.
Fuji Photo Film Co., Ltd.: *See—*
Ono, Yoshihiro; Harada, Shigeo; Mizobuchi, Yuzo; and Ikeda, Tomoaki, 4,177,072, Cl. 430-302.000.
Takahashi, Koji, 4,176,946, Cl. 355-38.000.
Fuji Xerox Co., Ltd.: *See—*
Takenouchi, Mutsuo; Ozawa, Takashi; Wako, Syoji; and Itoh, Satoru, 4,177,487, Cl. 358-294.000.
Fujibayashi, Kazuo, to Canon Kabushiki Kaisha. Compact retrofocus wide angle objective. 4,176,914, Cl. 350-214.000.
Fujimoto, Yasuhiro; and Suzuki, Masao, to Sansui Electric Co., Ltd. Moving magnet type pickup cartridge. 4,177,360, Cl. 179-100.41M.
Fujioka, Tomio: *See—*
Yonemitsu, Eiichi; Miyamori, Hiroshi; Nawata, Takanari; Fujioka, Tomio; Ito, Akira; and Kobayashi, Makoto, 4,177,247, Cl. 423-515.000.
Fujitsu Limited: *See—*
Furukawa, Yasuo; Goto, Yoshiro; and Inagaki, Takefumi, 4,177,379, Cl. 250-306.000.
Fukada Works, Ltd.: *See—*
Taki, Minoru, 4,177,444, Cl. 337-163.000.
Fukinuki, Takahiko; and Yoshigi, Hiroshi, to Hitachi, Ltd. Decoder for variable-length codes. 4,177,456, Cl. 340-347.0DD.
Fukuda, Hiroshi; and Matsuzaka, Haruo, to Matsu Kyu Kabushiki Kaisha. Contactless digital key switch. 4,176,782, Cl. 235-449.000.
Fukuda, Kenji: *See—*
Maeda, Yoshio; Matsumoto, Koichi; Fukuda, Kenji; and Shindo, Isao, 4,176,957, Cl. 356-319.000.
Funahashi, Osamu: *See—*
Mishima, Takao; Semba, Shoji; Ogata, Kiichi; and Funahashi, Osamu, 4,176,532, Cl. 68-19.000.
Furstlich Hohenzollernsche Huttenverwaltung Laucherthal: *See—*
Eisenmann, Siegfried; and Harle, Hermann, 4,177,025, Cl. 418-133.000.
Furukawa, Yasuo; Goto, Yoshiro; and Inagaki, Takefumi, to Fujitsu Limited. Back-scattered electron detector for use in an electron microscope or electron beam exposure system to detect back-scattered electrons. 4,177,379, Cl. 250-306.000.
G S & H Equipment Corporation: *See—*
Griner, Henry; Griner, Wade; Hyars, Claude; and Sweat, Tommy, 4,176,509, Cl. 56-27.500.
Griner, Henry; Griner, Wade; Hyars, Claude; and Sweat, Tommy, 4,176,510, Cl. 56-27.500.
GAF Corporation: *See—*
Chakrabarti, Paritosh M., 4,177,154, Cl. 252-32.500.
Gaffar, Abdul: *See—*
Gaffar, Maria C. S.; and Gaffar, Abdul, 4,177,258, Cl. 424-52.000.
Gaffar, Maria C. S.; and Gaffar, Abdul, to Colgate Palmolive Company. Dentifrice for dental remineralization. 4,177,258, Cl. 424-52.000.
Gagin, Lawrence V., to Johns-Manville Corporation. Glass composition for fiberization. 4,177,077, Cl. 106-50.000.
Gaishin, Rudolph M.; and Coveri, Garry C., to Heath Company. Radio control system with pluggable modules for changing system operating frequency. 4,177,426, Cl. 325-37.000.
Gallegos, Manuel. Supporting bracket for musical instruments. 4,176,580, Cl. 84-327.000.
Galy, Henri: *See—*
Boy, Aristide; Galy, Henri; Ivaldi, Raoul; and Passedroit, Hubert, 4,177,208, Cl. 260-504.00S.
Gamo, Hiroshi: *See—*
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Gandolfi, Luciano: *See—*
Iannuzzi, Giulio; deMartiis, Carlo C.; Del Bo, Vittorio; and Gandolfi, Luciano, 4,176,443, Cl. 29-589.000.
Gansauge, Jost; Muschi, Johann; and Freudlsperger, Hans, to Wacker-Chemie GmbH. Fluidized bed reactor. 4,176,710, Cl. 165-104.00F.
Ganszczyk, Helen: *See—*
Shadbolt, Philip; and Ganszczyk, Helen, 4,177,309, Cl. 428-195.000.
Garavalia, Thomas A.: *See—*
Schlangen, Andrew J.; McClead, Jerry W.; and Garavalia, Thomas A., 4,177,007, Cl. 415-160.000.
Garbalizer Corporation of America: *See—*
Brewer, John C., 4,176,800, Cl. 241-243.000.
Gardner, James F., to Ingersoll-Rand Company. Variable eccentric device. 4,176,983, Cl. 404-117.000.
Garrett Corporation, The: *See—*
Nancarrow, James H., 4,177,006, Cl. 415-151.000.
Rousseau, Jean L. I., 4,176,523, Cl. 62-2.000.
Gartung, Clifford W., to Pleion Corporation. Modular storage unit assembly. 4,176,889, Cl. 312-195.000.
Gary, Fred J. Heat recovery device for use in return air duct of forced air furnace. 4,176,787, Cl. 237-55.000.
Gebel, Iosif D.; Zykov, Arkady A.; Nefedov, Askold I.; Parshikov, Viktor I.; and Khrolenko, Viktor F., to Spetsialnoe Knostruktorskoe Bjuro PO Proektirovaniju Shlifovalnogo Oborudovania. Device for measuring the deviation of object with nominally circular cross-section from the round shape. 4,176,461, Cl. 33-178.00D.
Gebruder Welger: *See—*
Sacht, Hans O., 4,176,596, Cl. 100-88.000.
Gelfand, Ilya M.: *See—*
Bezvulyak, Anatoly S.; Gelfand, Ilya M.; Torchinsky, Efim M.; Pushkin, Sergei B.; Vedernikov, Rudolf K.; Kulachenkov, Gennady P.; Tkachuk, Petr F.; and Karyagin, Viktor F., 4,176,952, Cl. 356-47.000.
Gellman, Barry N., to Becton, Dickinson and Company. Stopper lock for culture bottle. 4,176,756, Cl. 215-274.000.
Gene Fowler and Friends Inc.: *See—*
Fowler, Eugene W., 4,176,860, Cl. 283-34.000.
General Cable Corporation: *See—*
Olszewski, Jerzy A.; and Ramy, Towheed, 4,176,893, Cl. 339-14.00R.

Rubinstein, Solomon, 4,176,866, Cl. 285-421.000.
General Dynamics Corporation: *See—*
Feddersen, Phyllis A., 4,176,602, Cl. 430-308.000.
Shores, Marvin W., 4,177,427, Cl. 325-369.000.
General Electric Company: *See—*
Divins, Larry A.; and Short, Larry E., 4,177,241, Cl. 423-20.000.
Eskesen, John H.; and Leibowitz, Herman M., 4,177,011, Cl. 416-191.000.
Fiedler, Howard C., 4,177,091, Cl. 148-111.000.
Gray, David A.; and Sivertsen, Marvin L., 4,176,826, Cl. 254-175.000.
Henderson, Alfred J., Jr.; and Fletcher, Thomas A., 4,177,504, Cl. 362-282.000.
Leete, Bernard D., 4,177,507, Cl. 363-51.000.
Malone, Paul E., 4,177,387, Cl. 290-40.00R.
McCardle, Arthur, Jr., 4,176,792, Cl. 239-265.410.
Razzano, John S.; Petersen, Louis P.; and Ashby, Bruce A., 4,177,200, Cl. 260-448.20N.
Riedmiller, Charles F.; and Bobo, Melvin, 4,177,004, Cl. 415-116.000.
Rupp, Charle R., 4,177,514, Cl. 364-200.000.
Smith, Alfred H., Jr., 4,177,301, Cl. 427-401.000.
Stoner, Jesse A.; and Mills, Robert L., 4,176,693, Cl. 141-1.000.
General Motors Corporation: *See—*
Adams, Richard L., 4,177,157, Cl. 252-182.100.
General Staple Company, Inc.: *See—*
Zahn, Irwin; and Meyer, Heinrich F., 4,176,448, Cl. 29-626.000.
Georg Rost & Sohne: *See—*
Strangfeld, Reiner, 4,176,821, Cl. 251-38.000.
Georgia-Pacific Corporation: *See—*
DeLuca, Raymond F., 4,176,569, Cl. 83-337.000.
Herault, Pierre C., 4,177,313, Cl. 428-288.000.
Rivers, Morris R.; Osterman, Ralph G.; and Warmuth, George H., 4,177,048, Cl. 55-275.000.
Gerry, Martin E. Modulation ignition system. 4,176,647, Cl. 123-148.00E.
Gerschwitz, Walter: *See—*
Hoefer, Friedrich-Wilhelm; Gerschwitz, Walter; and Schwerin, Guenther, 4,176,685, Cl. 137-596.130.
Gerstenberg, Roy W.: *See—*
Barnes, William; Gerstenberg, Roy W.; Kropa, Gomer E.; and LeJeune, Roland A., 4,176,796, Cl. 241-30.000.
Gesellschaft fur elektronische Rohren Comet Bern: *See—*
Perret, Maurice, 4,177,495, Cl. 361-279.000.
Gewerkschaft Eisenhutte Westfalia: *See—*
Erwien, Helmut; and Karsten, Werner, 4,176,884, Cl. 299-34.000.
Ghosh, Amal K.: *See—*
Feng, Tom; and Ghosh, Amal K., 4,177,093, Cl. 148-174.000.
Gibson, Harry; and Jones, John W. D., to Smiths Industries Limited. Aircraft instruments. 4,176,546, Cl. 73-182.000.
Gikis, Benjamin J.: *See—*
Murray, Robert G.; and Gikis, Benjamin J., 4,176,465, Cl. 34-31.000.
Gillette Company, The: *See—*
Ascoli, Enzo, 4,177,413, Cl. 320-2.000.
Gillissie, Michael J. E., to Northern Telecom Limited. Container apparatus for handling semiconductor wafers. 4,176,751, Cl. 211-41.000.
Gillow, George B.: *See—*
Armstrong, Rolfe D.; and Gillow, George B., 4,177,455, Cl. 340-347.0DD.
Gilst, Carl V., to Ag Best Corporation. Gate latching apparatus for animal closure panels. 4,176,869, Cl. 292-304.000.
Gimonet, Marie-Edith: *See—*
Deficis, Alain; Gimonet, Marie-Edith; Priou, Alain; and Fournet-Fayas, Christian, 4,177,422, Cl. 324-95.000.
Gingo, Joseph M.: *See—*
Russell, C. Paul; Gingo, Joseph M.; and Drica-Minieris, Oswald A., 4,176,705, Cl. 152-359.000.
Giordano, Dennis R., to Safron Printing Company. Non-counterfeitable documents. 4,176,859, Cl. 283-8.00R.
Giraldi, Piernicola: *See—*
Doria, Gianfederico; Romeo, Ciriaco; Lauria, Francesco; Corno, Maria L.; Giraldi, Piernicola; and Tibolla, Marcello, 4,177,276, Cl. 424-263.000.
Doria, Gianfederico; Romeo, Giriaco; Lauria, Francesco; Corno, Maria L.; Giraldi, Piernicola; and Tibolla, Marcello, 4,177,286, Cl. 424-283.000.
Gist-Brocades N.V.: *See—*
Akkerboom, Piet J.; Lower, Geertruiida J.; and Timp, Willem J., 4,177,189, Cl. 260-239.100.
Gittner, Franz; Glaser, Arnaldo; and Kotke, Klaus D., to Bekum Maschinenfabriken GmbH. Blow molding method. 4,177,239, Cl. 264-530.000.
Glacier Metal Company Limited, The: *See—*
Dickson, Eric W., 4,177,063, Cl. 75-62.000.
Glaser, Arnaldo: *See—*
Gittner, Franz; Glaser, Arnaldo; and Kotke, Klaus D., 4,177,239, Cl. 264-530.000.
Glaser, Hans E. Binding for cross-country skis. 4,176,856, Cl. 280-611.000.
Gliatas, Themistocles H., to Ranco Incorporated. Butterfly valve. 4,176,823, Cl. 251-306.000.
Glick, Earl. Universal electrical outlet box and method of installing. 4,176,758, Cl. 220-3.300.
Global Marine, Inc.: *See—*
Wetmore, Sherman B.; McNary, James F.; and Person, Abraham, 4,176,722, Cl. 175-7.000.
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Glogowski, Andrzej: *See—*
Bielecki, Marek; Bogdanski, Andrzej; Buxakowski, Andrzej; Chudzinski, Janusz; Glogowski, Andrzej; Kopczynski, Marian; Krolikowski, Andrzej; Kryszewski, Jozef; Moczulski, Zdzislaw; Ochocki, Wlodzimierz; Pomorski, Aleksander; Rumatowski, Karol; Sawicki, Janusz; Szostakowski, Henryk; Warowny, Tadeusz; Wisniewski, Teofil; and Wozniak, Antoni, 4,176,624, Cl. 123-32.0EA.
Gobl, Horst, to Linde Aktiengesellschaft. Thermally insulated vessel especially for liquefied gases. 4,176,761, Cl. 220-438.000.
Godbey, Josiah J. Internal electrical interconnect coupler. 4,176,894, Cl. 339-15.000.
Goddard, Michael R.: *See—*
King, Colin M.; Goddard, Michael R.; and Murray, Dudley C., 4,176,606, Cl. 102-37.400.
Godfrey, Steven W., to Hunt Manufacturing Co. Hanging file support frame. 4,176,753, Cl. 211-182.000.
Goebel, Bert; and Perez, Leo. Hitting mitt. 4,176,407, Cl. 2-20.000.
Gohlke, Arthur F., to Cities Service Company. Composition for controlling fungi. 4,177,288, Cl. 424-294.000.
Goland, Yaacov, to Joy Manufacturing Company. Electrostatic precipitators. 4,177,047, Cl. 55-146.000.
Goldie, Harry: *See—*
McLaughlin, James F.; and Goldie, Harry, 4,177,437, Cl. 333-13.000.
Goldsmith, Burton J.: *See—*
Bigelow, Eugene H.; and Goldsmith, Burton J., 4,176,715, Cl. 166-138.000.
Goldstein, Harold; and Montren, William T., to Control Electronics Co., Inc. Electronic votive lights. 4,177,407, Cl. 315-312.000.
Goldsworthy, William B.; and Karlson, Harald E., to McDonnell Douglas Corporation. Apparatus for continuously fabricating three-dimensional filament reinforced foam insulation. 4,177,029, Cl. 425-112.000.
Gony, Jean-Noel: *See—*
Clin, Francois H.; Gony, Jean-Noel; and Proust, Francois O., 4,176,799, Cl. 241-74.000.
Good, William R.: *See—*
Mueller, Karl F.; and Good, William R., 4,177,056, Cl. 71-93.000.
Goodyear Tire & Rubber Company, The: *See—*
Russell, C. Paul; Gingo, Joseph M.; and Drica-Minieris, Oswald A., 4,176,705, Cl. 152-359.000.
Goossens, John: *See—*
Traenckner, Hans-Joachim; Goossens, John; Kremer, Wolfgang; and Kronke, Heinz, 4,177,172, Cl. 260-15.000.
Gordon, Michael E.; and Stieger, Frank, to Polaroid Corporation. Laminar batteries and methods of making the same. 4,177,330, Cl. 429-152.000.
Gorini, Robert F.; Johnson, Herbert; and Sillars, Frederick S., to USM Corporation. Method for stiffening flexible workpieces. 4,177,098, Cl. 156-80.000.
Gorton, Howard B., to Ajax Hardware Corporation. Drawer and support system. 4,176,890, Cl. 312-343.000.
Goss, Wilbur H.; and Bergman, Gunnar B., to SeaTek Corporation. Control force tank and method for stabilizing floating vessels. 4,176,614, Cl. 114-125.000.
Goto, Yoshiro: *See—*
Furukawa, Yasuo; Goto, Yoshiro; and Inagaki, Takefumi, 4,177,379, Cl. 250-306.000.
Gotoh, Isamu; Okamoto, Yoshinori; and Wakatsuki, Goroei, to Honda Giken Kogyo Kabushiki Kaisha. Engine starting device. 4,176,648, Cl. 123-179.00S.
Goulay, Jean: *See—*
Lormeau, Jean-Claude; Choay, Jean; and Goulay, Jean, 4,177,262, Cl. 424-105.000.
Gouy, Hyppolite P.: *See—*
Cousin, Jacques V. L.; Decroix, Marcel E. R.; and Gouy, Hyppolite P., 4,176,735, Cl. 192-12.00D.
Gover, Russell D., Sr. Boring tool. 4,176,990, Cl. 408-189.000.
Grab, Frederick L.: *See—*
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Granatek, Edmund S.; Ruva, Frank D.; and Grab, Frederick L., to Bristol-Myers Company. Silver salts of phosphanilic acid. 4,177,199, Cl. 260-430.000.
Granet, Jacques R., to Le Material Telephonique. Apparatus for regulating the passage and flow-rate of a liquid. 4,177,018, Cl. 417-338.000.
Grawey, Charles E.; Ball, Glenn A.; and Zook, Donald G., to Caterpillar Tractor Co. Core portion for a tube tire. 4,177,027, Cl. 425-49.000.
Gray, David A.; and Sivertsen, Marvin L., to General Electric Company. Safety catch apparatus for a suspension system. 4,176,826, Cl. 254-175.000.
Greaves, Terence M.; and Summers, Robert D., to Rolls-Royce Limited. Cooled rotor blade for a gas turbine engine. 4,177,010, Cl. 416-97.00R.
Greber, Gerd: *See—*
Rody, Jean; Greber, Gerd; and Muller, Helmut, 4,177,186, Cl. 260-45.80N.
Greenhalgh, Peter F.: *See—*
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Greeninger, Carroll D., to Bunyan's Woodcutter Corp. Fireplace wood cutting machine. 4,176,696, Cl. 144-3.00K.
Greenspan, Stephen B.: *See*—
Balasubramanian, Peruvemba S.; and Greenspan, Stephen B., 4,177,452, Cl. 340-166.00R.
Gregory, Stephen A.; and Welzen, Joseph A. Stenotype tape marking attachment. 4,176,973, Cl. 400-91.000.
Griffin, Jacqulyn G. Batting baseball tee. 4,176,838, Cl. 273-26.00E.
Griggs, William K.; and Holland, Harry, to Tumbleweed Enterprises. Motorcycle canteen. 4,176,770, Cl. 224-30.00A.
Griner, Henry; Griner, Wade; Hyars, Claude; and Sweat, Tommy, to G S & H Equipment Corporation. Laterally adjustable tobacco combine. 4,176,509, Cl. 56-27.500.
Griner, Henry; Griner, Wade; Hyars, Claude; and Sweat, Tommy, to G S & H Equipment Corporation. Tobacco combine hydraulic motor system. 4,176,510, Cl. 56-27.500.
Griner, Wade: *See*—
Griner, Henry; Griner, Wade; Hyars, Claude; and Sweat, Tommy, 4,176,509, Cl. 56-27.500.
Griner, Henry; Griner, Wade; Hyars, Claude; and Sweat, Tommy, 4,176,510, Cl. 56-27.500.
Griselli, Pier Luigi: *See*—
Cecchin, Giuliano; Luciani, Luciano; and Griselli, Pier Luigi, 4,177,160, Cl. 252-429.00B.
Groen, Marinus B.: *See*—
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Grolz, Heinz: *See*—
Diegelmann, Winfried; Schardt, Gunter; Klatt, Jochen; and Grolz, Heinz, 4,177,316, Cl. 428-367.000.
Gropper, Hans: *See*—
Boettcher, Klaus; Hoerdt, Heinrich G.; Pfleger, Klaus; Zacher, Wieland; and Gropper, Hans, 4,177,340, Cl. 526-329.000.
Grotta, Henry M.: *See*—
Rosenberg, Harvey S.; and Grotta, Henry M., 4,177,245, Cl. 423-242.000.
Grubbs, Harvey J.: *See*—
Van Auken, Thomas V.; Grubbs, Harvey J.; and Johnson, William R., Jr., 4,177,339, Cl. 526-314.000.
GTE Laboratories Incorporated: *See*—
Kocher, Robert C.; and Piorkow, Alfred, 4,176,925, Cl. 354-1.000.
GTE Sylvania Canada Limited: *See*—
Nattel, William, 4,176,759, Cl. 220-3.940.
GTE Sylvania Incorporated: *See*—
Antonucci, Ermen S.; Cadden, Duane L.; Regenbrecht, Albert; and Schwartz, Edward, 4,176,891, Cl. 316-2.000.
Guaita, Cesare: *See*—
Siclari, Francesco; Rossi, Pietro P.; Guaita, Cesare; and L'Acqua, Vito, 4,177,214, Cl. 260-601.00R.
Guillod, Mark S.: *See*—
Michaels, Alan S.; and Guillod, Mark S., 4,177,256, Cl. 424-22.000.
Gustav Wiegard Maschinenfabrik: *See*—
Holter, Karl; and Wiegard, Gustav, 4,176,462, Cl. 33-182.000.
H. H. Robertson Company: *See*—
Ting, Raymond M. L., 4,176,503, Cl. 52-1.000.
Haake, Inc.: *See*—
Kromer, Heiner M.; and Ossman, John, 4,176,968, Cl. 366-97.000.
Hach Chemical Company: *See*—
Hach, Clifford C.; and Zemke, Wayne P., 4,177,148, Cl. 210-396.000.
Hach, Clifford C.; and Zemke, Wayne P., to Hach Chemical Company. Mechanical strainer. 4,177,148, Cl. 210-396.000.
Hachiya, Iwao: *See*—
Mochizuki, Keizo; and Hachiya, Iwao, 4,177,296, Cl. 426-632.000.
Haferl, Peter E., to RCA Corporation. Current switching networks. 4,177,392, Cl. 307-254.000.
Hafner, Otto P. Locking joint machine. 4,176,441, Cl. 29-566.100.
Hagiuda, Nobuyoshi; and Tanaka, Hiroaki, to Nippon Kogaku K.K. Shutter release mechanism for cinecamera. 4,176,924, Cl. 352-174.000.
Hagiwara, Hidehiko: *See*—
Imaki, Masakatu; Hagiwara, Hidehiko; and Usui, Seiji, 4,177,126, Cl. 204-195.00F.
Hahn, Ulrich; and Stumpe, Klaus, to C. Otto & Comp. G.m.b.H. Process for treating particles of adsorbent used to remove phenol from waste water. 4,177,139, Cl. 210-33.000.
Halbfoster, Christopher J., to Ecodyne Corporation. Mixture of oppositely charged filter aid material. 4,177,142, Cl. 210-75.000.
Hall, Emerson O.: *See*—
Clipston, Robert H.; Hall, Emerson O.; and Ng, Hon-Hei F., 4,177,303, Cl. 427-259.000.
Hall, Wilbur S., to Amchem Products, Inc. Composition comprising resin and pigment for autodeposition. 4,177,180, Cl. 260-29.70H.
Halliburton, Ronald D.: *See*—
Ryan, Allen L.; Jansons, Eric G.; Halliburton, Ronald D.; and Pearson, James H., 4,176,844, Cl. 273-121.00A.
Hamacher, Leonhard W.: *See*—
Young, Maurice A.; and Hamacher, Leonhard W., 4,176,513, Cl. 57-237.000.
Hammer, Jacob M.; and Neil, Clyde C., to RCA Corporation. Fiber-optic thermometer. 4,176,551, Cl. 73-339.00R.
Hammer, Jacob M., to RCA Corporation. Fiber-optic thermometer. 4,176,552, Cl. 73-339.00R.
Hancock, Charles J.: *See*—
Eadie, David W.; and Hancock, Charles J., 4,176,926, Cl. 354-4.000.
Hankosky, Andrew: *See*—
Clapper, Robert L.; Schoneweis, E. Frederick; Hankosky, Andrew; and Bake, Earl A., 4,176,981, Cl. 403-31.000.
Hansen, Bertil: *See*—
Fex, Hans; Hansen, Bertil; Holmberg, Krister; Hogberg, Bertil; and Konyves, Imre, 4,177,269, Cl. 424-243.000.
Hansen, Jorgen F., to Nordisk Insulinlaboratorium. Process for recovering purified albumin from blood plasma using PEG and caprylic acid. 4,177,188, Cl. 260-122.000.
Hara, Takeo: *See*—
Kasubuchi, Takeshi; Ozawa, Kaoru; and Hara, Takeo, 4,177,519, Cl. 364-712.000.
Harada, Shigeo: *See*—
Ono, Yoshihiro; Harada, Shigeo; Mizobuchi, Yuzo; and Ikeda, Tomoaki, 4,177,072, Cl. 430-302.000.
Harigaya, Isao: *See*—
Ito, Fumio; Tsunekawa, Tokuichi; Taguchi, Tetsuya; and Harigaya, Isao, 4,176,929, Cl. 354-29.000.
Harle, Hermann: *See*—
Eisenmann, Siegfried; and Harle, Hermann, 4,177,025, Cl. 418-133.000.
Harris Corporation: *See*—
Karlin, James H., 4,177,501, Cl. 362-26.000.
Harris, Len A.: *See*—
Baney, Ronald H.; and Harris, Len A., 4,177,175, Cl. 260-29.20M.
Harrison, David L.: *See*—
Denny, Patrick J.; Harrison, David L.; and Stacey, Martyn H., 4,177,168, Cl. 252-470.000.
Harsco Corporation: *See*—
Pack, Paul R., 4,177,062, Cl. 75-28.000.
Hartman & Braun AG.: *See*—
Fabinski, Walter; and Faulhaber, Reimar, 4,176,963, Cl. 356-418.000.
Hartman, Robert F.: *See*—
Linstromberg, William J.; and Hartman, Robert F., 4,176,527, Cl. 62-320.000.
Hartman, Robert J.: *See*—
Austin, Arthur L.; Levis, William W., Jr.; Pizzini, Louis C.; and Hartman, Robert J., 4,177,335, Cl. 521-171.000.
Harvey, Kenneth L.; and Dixon, Howard D., to United States of America, Air Force. Low shear mixing process for the manufacture of solid propellants. 4,177,227, Cl. 264-3.00R.
Hase, Yoshihiko: *See*—
Hayashi, Kiyoshige; Nakaniwa, Mikio; Kobayashi, Nobuyuki; Yamamoto, Minoru; and Hase, Yoshihiko, 4,177,133, Cl. 208-50.000.
Hasebe, Mitsuo, to Ricoh Company, Ltd. Electrophotographic apparatus. 4,176,943, Cl. 355-14.00R.
Hasegawa, Atsushi: *See*—
Obi, Tatsuro; Koyama, Teruo; Tanaka, Tadashi; and Hasegawa, Atsushi, 4,177,323, Cl. 428-622.000.
Hasegawa, Isao, to Clarion Co. Ltd. Tape running mechanism provided with automatic stopping device. 4,177,489, Cl. 360-74.200.
Hasegawa, Kensuke: *See*—
Motoda, Kenro; and Hasegawa, Kensuke, 4,177,002, Cl. 414-751.000.
Haslett, John A., Jr., to Flo Dri Company. Compressed gas filter. 4,177,049, Cl. 55-483.000.
Hassell, Aarno A., to Rogers Corporation. Cushion insole. 4,176,476, Cl. 36-44.000.
Hata, Yukinori; Watanabe, Tsutomu; and Itoh, Fumio, to Oji Paper Co., Ltd. Photosensitive resin composition comprising cellulose ether aromatic carboxylic ester. 4,177,073, Cl. 430-188.000.
Hatada, Kenzo: *See*—
Kawakami, Hakuhei; Ishihara, Takeshi; and Hatada, Kenzo, 4,176,518, Cl. 58-38.00R.
Hatter, Edward E.; Taylor, Richard H.; and McGunigle, Richard D., to Biosonics International, Ltd. Ultrasonic tooth cleaner. 4,176,454, Cl. 433-119.000.
Hauptschein, Murray: *See*—
Toukan, Sameeh S.; and Hauptschein, Murray, 4,177,351, Cl. 548-325.000.
Havey, Ambrose S., III. Multi-element casket. 4,176,431, Cl. 27-2.000.
Hayakawa, Mitsutaka: *See*—
Ito, Yasuro; Kaga, Hideharu; Yamamoto, Yasuhiro; Kuroha, Kenji; and Hayakawa, Mitsutaka, 4,176,965, Cl. 366-8.000.
Hayashi, Kiyoshi: *See*—
Nakamura, Soichi; and Hayashi, Kiyoshi, 4,176,913, Cl. 350-214.000.
Hayashi, Kiyoshige; Nakaniwa, Mikio; Kobayashi, Nobuyuki; Yamamoto, Minoru; and Hase, Yoshihiko, to Maruzen Petrochemical Co., Ltd. Process for producing high-crystalline petroleum coke. 4,177,133, Cl. 208-50.000.
Hayashi, Masaaki; Tsuneta, Kazuyoshi; Takada, Hiroshi; Kenmotsu, Nobuhiro; and Sasaki, Hiroharu, to Dai Nippon Toryo Co., Ltd. Epoxy resin composition cured by reaction product of phenol carboxylic acids with polyamino compounds. 4,177,174, Cl. 260-18.0PN.
Hayashi, Minoru: *See*—
Kishi, Kazuo; Hayashi, Minoru; and Naganuma, Kazuo, 4,176,607, Cl. 102-49.300.
Hayashida, Nariyoshi: *See*—
Yoshimura, Tatsushiro; Namba, Mutsusuke; Suzue, Seisuke; Tominaga, Shigetake; Mizuno, Toshio; and Hayashida, Nariyoshi, 4,177,320, Cl. 428-419.000.
Hazan, Isidor, to Du Pont de Nemours, E. I., and Company. Process for electrodeposition of graft copolymer. 4,177,124, Cl. 204-181.00C.

Headley, Jack W.; Skow, Andrew M.; and Titiriga, Andrew, Jr., to Northrop Corporation. Shark nose for aircraft. 4,176,813, Cl. 244-130.000.
Heath Company: *See*—
Gaishin, Rudolph M.; and Covert, Garry C., 4,177,426, Cl. 325-37.000.
Heiba, El-Ahmadi I.; Kinney, Robert E.; and Stead, George E., to Mobil Oil Corporation. Succinimides of amino aromatic sulfonic acid salts. 4,177,192, Cl. 260-326.220.
Heilhecker, Joe K.: *See*—
Taft, Daniel G.; and Heilhecker, Joe K., 4,176,986, Cl. 405-211.000.
Heimlicher, Paul, to Maschinenfabrik WIFAG. Apparatus for adjusting printing press for changes in paper size. 4,176,833, Cl. 270-71.000.
Heinemann, Henning: *See*—
Liepmann, Hans; Hueschens, Rolf; Milkowski, Wolfgang; Zeugner, Horst; Heinemann, Henning; Wolf, Klaus-Ullrich; Hell, Insa; and Hempel, Reinhard, 4,177,287, Cl. 424-285.000.
Heinrich, Elmer G., to Citation Manufacturing Co., Inc. Electric clutch control. 4,176,793, Cl. 239-407.000.
Heise, Arend: *See*—
Bossert, Friedrich; Wehinger, Egbert; Heise, Arend; Kazda, Stanislav; Stoepel, Kurt; Towart, Robertson; Vater, Wulf; and Schlossmann, Klaus, 4,177,278, Cl. 424-266.000.
Hell, Insa: *See*—
Liepmann, Hans; Hueschens, Rolf; Milkowski, Wolfgang; Zeugner, Horst; Heinemann, Henning; Wolf, Klaus-Ullrich; Hell, Insa; and Hempel, Reinhard, 4,177,287, Cl. 424-285.000.
Hellberg, Rainer; Steinke, Leo; and Fritz, Adolf, to Robert Bosch GmbH. Engine ignition system with variable spark internal duration. 4,176,644, Cl. 123-148.00E.
Hempel, Reinhard: *See*—
Liepmann, Hans; Hueschens, Rolf; Milkowski, Wolfgang; Zeugner, Horst; Heinemann, Henning; Wolf, Klaus-Ullrich; Hell, Insa; and Hempel, Reinhard, 4,177,287, Cl. 424-285.000.
Henderson, Alfred J., Jr.; and Fletcher, Thomas A., to General Electric Company. Luminaire reflector mounting for rotation of asymmetric reflector. 4,177,504, Cl. 362-282.000.
Hendrix Electronics Incorporated: *See*—
Chamberlin, Howard A., Jr., 4,177,409, Cl. 315-383.000.
Henkel Kommanditgesellschaft auf Aktien (Henkel KGaA): *See*—
Lehmann, Hans-Juergen; Bietz, Rolf; and Wegner, Juergen, 4,177,294, Cl. 426-271.000.
Henri Muhlethaler S.A.: *See*—
Muhlethaler, Henri, 4,176,742, Cl. 206-98.000.
Henry, David W.: *See*—
Wu, Helen Y.; Smith, Thomas H.; and Henry, David W., 4,177,264, Cl. 424-180.000.
Henry, James W., to Eastman Kodak Company. Population and profile data of bodies in a transparent mass. 4,177,482, Cl. 358-93.000.
Henry, Paul M.; and Lillis, William J., to Motorola, Inc. Reference circuit for providing a plurality of regulated currents having desired temperature characteristics. 4,177,417, Cl. 323-4.000.
Herault, Pierre C., to Georgia-Pacific Corporation. Amine-modified lignosulfonate-extended phenol formaldehyde resins. 4,177,313, Cl. 428-288.000.
Herb, Carl C.: *See*—
Clark, William E.; and Herb, Carl C., 4,176,690, Cl. 137-8.000.
Herbert, Nicholas: *See*—
Cromwell, John E.; Herbert, Nicholas; and Hyde, Glenn F., 4,176,434, Cl. 29-156.630.
Hercules Incorporated: *See*—
Dale, Warren H., 4,176,495, Cl. 47-57.500.
Hergenrother, George R.; and Sprague, Peter J., to Advent Corporation. Projection cathode ray tube having target angularly and longitudinally adjustable to tube axis. 4,177,400, Cl. 313-477.00R.
Hermann Berstorff Maschinenbau GmbH: *See*—
Brinkmann, Heinz; and Spielhoff, Horst, 4,176,967, Cl. 366-83.000.
Hermeyer, Bernd; and Ochmann, Rudolf, to U.S. Philips Corporation. Circuit for adjusting tube anode current in an X-ray generator. 4,177,406, Cl. 315-307.000.
Herring, John L. Storage structure for artificial fly-type fishing lures. 4,176,491, Cl. 43-57.50R.
Herring, Julian N., to Adult Care Products, Inc. Disposable liquid absorbent pad and method. 4,176,667, Cl. 128-287.000.
Herrington, Daniel R.; and Schwerko, Albert P., to Standard Oil Company (Ohio), The. Hydrotreating process utilizing elemental sulfur for presulfiding the catalyst. 4,177,136, Cl. 208-215.000.
Herrmann, Fritz; and Bilal, Abdel-Latif. Apparatus for separating ions present as solutes. 4,177,130, Cl. 204-299.00R.
Herschler, Robert J., to Crown Zellerbach. Enhancing tissue penetration of physiologically active steroidal agents with DMSC. 4,177,267, Cl. 424-238.000.
Hershey, Harold J.: *See*—
Beecher, Robert L., II; and Hershey, Harold J., 4,177,364, Cl. 200-5.00B.
Hewlett, Anthony M., to National Research Development Corporation. Medical ventilation apparatus. 4,176,663, Cl. 128-204.260.
Hewlett-Packard Company: *See*—
Lau, Silvanus S.; Mayer, James W.; and Sigmon, Thomas W. (Thomas W. Sigmon, a part interest assors. to), 4,177,084, Cl. 148-1.500.
Neff, Randall B., 4,177,520, Cl. 364-900.000.
Olander, Emil E., Jr.; James, Rex L.; Larson, Ivar W.; Covington, Wayne F.; Walden, Jack M.; Watson, Robert E.; Yockey, Francis J.; Wenninger, Fred, Jr.; and Russell, Homer C., 4,177,518, Cl. 364-710.000.
HFM Hohenloher Fahrzeuge- und Maschinenvertrieb GmbH: *See*—
Schaeff, Hans, 4,176,726, Cl. 180-15.000.
Hiatt, Sidney A.: *See*—
Wright, Ronald E.; Kennedy, Ronald J.; and Hiatt, Sidney A., 4,176,414, Cl. 5-13.000.
Hickey, Robert F.; and Owens, Roger W., to Ecolotrol, Inc. Excess-growth control system for fluidized-bed reactor. 4,177,144, Cl. 210-86.000.
Hildebrand, Verne E.: *See*—
Seeley, Elwin W.; and Hildebrand, Verne E., 4,177,468, Cl. 343-710.000.
Hildon, Anthony M.; and Greenhalgh, Peter F., to Interox Chemicals Limited. Epoxidation. 4,177,196, Cl. 260-348.250.
Hill, Gary L.: *See*—
Hill, Wayland W.; and Hill, Gary L., 4,176,854, Cl. 280-478.00R.
Hill, Wayland W.; and Hill, Gary L. Connection facilitating hitch. 4,176,854, Cl. 280-478.00R.
Hills, Ronald F.: *See*—
Lee, James A.; Madsen, Peter E.; and Hills, Ronald F., 4,177,087, Cl. 148-11.50R.
Hiltebrandt, Siegfried: *See*—
Schubert, Herbert; and Hiltebrandt, Siegfried, 4,176,661, Cl. 128-6.000.
Hines, Clyde K.; Long, Everett J.; and Muench, Elmer W., to Everett/-Charles, Inc. Low insertion force connector. 4,176,900, Cl. 339-75.0MP.
Hintzmann, Kurt; Kaiser, Reinhold; Link, Wolfgang; Minner, Willy; Mutz, Dieter; Salomon, Manfred; and Wingert, Arnim, to Licentia Patent-Verwaltungs-G.m.b.H. Integrated circuit arrangement with means for avoiding undesirable capacitive coupling between leads. 4,177,480, Cl. 357-84.000.
Hirose, Takao: *See*—
Uemura, Seiichi; Yamamoto, Syunichi; Hirose, Takao; Takashima, Hiroaki; Kato, Osamu; and Nagi, Minoru, 4,177,132, Cl. 208-22.000.
Hiscock, Benjamin E., to Simmonds Precision Products, Inc. Incandescent bar display module. 4,177,502, Cl. 362-218.000.
Hitachi, Ltd.: *See*—
Fukinuki, Takahiko; and Yoshigi, Hiroshi, 4,177,456, Cl. 340-347.0DD.
Ikeda, Takatoshi, 4,177,449, Cl. 340-146.3AG.
Ishida, Yoshio, 4,177,402, Cl. 315-39.710.
Kotera, Nobuo; Oi, Tetsu; and Nishida, Takashi, 4,177,372, Cl. 219-121.00L.
Maeda, Yoshio; Matsumoto, Koichi; Fukuda, Kenji; and Shindo, Isao, 4,176,957, Cl. 356-319.000.
Mastuzaki, Harumi; Ebara, Katsuya; and Takahashi, Sankichi, 4,177,138, Cl. 210-22.00C.
Shigeta, Junji; Oi, Tetsu; Kotera, Nobuo; Nakashima, Muneyasu; and Miyamoto, Nobuo, 4,177,298, Cl. 427-85.000.
Sunami, Hideo; Kubo, Masaharu; and Takemoto, Iwao, 4,177,391, Cl. 307-221.00D.
Suzuki, Yoshihiro; Ura, Mitsuru; and Takahashi, Hiroshi, 4,177,114, Cl. 204-38.00B.
Takasugi, Wasao, 4,177,394, Cl. 307-357.000.
Yamane, Mikiya; Tomura, Teruichi; and Watanabe, Yoshio, 4,177,401, Cl. 313-485.000.
Hitachi Metals, Inc.: *See*—
Sawada, Takeshi; and Inoue, Takeshi, 4,176,539, Cl. 72-178.000.
Hitachi Plant Engineering & Construction Co., Ltd.: *See*—
Mastuzaki, Harumi; Ebara, Katsuya; and Takahashi, Sankichi, 4,177,138, Cl. 210-22.00C.
Hix, Harold A. Cementing tool and method of utilizing same. 4,176,717, Cl. 166-289.000.
Hobrecht, Stephen W., to National Semiconductor Corporation. Multi output differential amplifier. 4,177,432, Cl. 330-252.000.
Hodson, Harold F.; and Batchelor, John F., to Burroughs Wellcome Co. Cyclic sulphur compounds. 4,177,257, Cl. 424-46.000.
Hoechst Aktiengeselischaft: *See*—
Dalibor, Horst, 4,177,183, Cl. 260-31.40R.
Hoechst Aktiengesellschaft: *See*—
Kleber, Rolf; and Cuntze, Ulrich, 4,177,231, Cl. 264-130.000.
Rebsdat, Siegfried; Mayer, Sigmund; Alfranseder, Josef; and Riedl, Josef, 4,177,169, Cl. 252-476.000.
Scholz, Manfred; Strie, Lothar; and Stendenbach, Karl-Heinz, 4,176,437, Cl. 29-402.120.
Thummler, Ursus; Werner, Hugo; and Sander, Harry, 4,176,765, Cl. 222-218.000.
Hoefer, Friedrich-Wilhelm; Gerschwitz, Walter; and Schwerin, Guenther, to Robert Bosch GmbH. Valve arrangement for controlling the flow of hydraulic fluid to and from a user. 4,176,685, Cl. 137-596.130.
Hoerdt, Heinrich G.: *See*—
Boettcher, Klaus; Hoerdt, Heinrich G.; Pfleger, Klaus; Zacher, Wieland; and Gropper, Hans, 4,177,340, Cl. 526-329.000.
Hoffman, Alfred A., Jr.: *See*—
Irvin, Howard B.; Sherk, Fred T.; and Hoffman, Alfred A., Jr., 4,177,250, Cl. 423-573.00G.
Hoffman-La Roche Inc.: *See*—
Hromatka, Otto; Binder, Dieter; Pfister, Rudolf; and Zeller, Paul, 4,177,193, Cl. 549-64.000.
Hoffman, Roy L.; Kempke, William G.; McCullough, John W.; Soltis, Frank G.; and Turner, Richard T., to International Business Machines Corporation. Task handling apparatus for a computer system. 4,177,513, Cl. 364-200.000.

Hogberg, Bertil: *See—*
Fex, Hans; Hansen, Bertil; Holmberg, Krister; Hogberg, Bertil; and Konyves, Imre, 4,177,269, Cl. 424-243.000.

Hohl, James H.: *See—*
Klara, Charles J.; Hohl, James H.; and Clymer, Wilbur L., 4,176,763, Cl. 221-93.000.

Hoinski, Walter W.; and Simkanich, John J., to Power Systems Development Corp. Two-way alarm safety apparatus. 4,177,460, Cl. 340-576.000.

Hokuyo, Shigeru; and Gamo, Hiroshi, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor switching device. 4,177,477, Cl. 357-38.000.

Holland, Harry: *See—*
Griggs, William K.; and Holland, Harry, 4,176,770, Cl. 224-30.00A.

Holman, William P. Geothermal home construction. 4,176,788, Cl. 237-81.000.

Holmberg, Krister: *See—*
Fex, Hans; Hansen, Bertil; Holmberg, Krister; Hogberg, Bertil; and Konyves, Imre, 4,177,269, Cl. 424-243.000.

Holmberg, Scott H., to Burroughs Corporation. High temperature amorphous memory device for an electrically alterable read-only memory. 4,177,475, Cl. 357-2.000.

Holmes, Robert G., to Ohio Agricultural Research and Development Center. Sorting system and apparatus. 4,176,750, Cl. 209-699.000.

Holter, Karl; and Wiegard, Gustav, to Mannesmann Aktiengesellschaft; and Gustav Wiegard Maschinenfabrik. Apparatus for inspecting the geometry of dual roller tracks for continuous castings. 4,176,462, Cl. 33-182.000.

Holtzapple, Mark: *See—*
Holtzapple, Mark T.; Wehe, Robert L.; Myer, Charles G.; and Carson, William W., 4,176,522, Cl. 60-459.000.

Holtzapple, Mark T.; Wehe, Robert L.; Myer, Charles G.; and Carson, William W., to Holtzapple, Mark. Torque monitor. 4,176,522, Cl. 60-459.000.

Holzhauser, Ronald C.; Zirngibl, Carl H.; and O'Brien, Vincent J., to Eastman Kodak Company. Sheet feeding apparatus for use with copier/duplicators or the like. 4,176,945, Cl. 355-23.000.

Homan, Gary R.; and Lee, Chi-Long, to Dow Corning Corporation. Method of improving high voltage insulating devices. 4,177,322, Cl. 428-447.000.

Honda Giken Kogyo Kabushiki Kaisha: *See—*
Gotoh, Isamu; Okamoto, Yoshinori; and Wakatsuki, Goroei, 4,176,648, Cl. 123-179.00S.

Honda Motor Co., Ltd.: *See—*
Siozawa, Nobuo; Kikuchi, Uhee; Kimura, Suguru; Todoroki, Nobuaki; Yasukawa, Jun-ichi; and Kamiyama, Satoru, 4,177,123, Cl. 204-181.00C.

Honeywell Inc.: *See—*
Peterson, Dean M., 4,177,469, Cl. 346-110.00R.

Hong, Se J.: *See—*
Fleisher, Harold; and Hong, Se J., 4,177,355, Cl. 178-22.000.

Honig, Helmut, to Deuzer Maschinenfabrik GmbH. Welding machine for welding pre-weld flanges and slip-on flanges onto pipes. 4,177,371, Cl. 219-59.100.

Honnorat, Yves C.; Raisson, Gerard D.; and Morlet, Jean G., to Creusot-Loire. Device for the manufacture of spherical metallic powder. 4,177,026, Cl. 425-7.000.

Hook, James M.: *See—*
Rickards, Michael A.; Ruhe, Richard K.; Meyerhoff, Leonard; and Hook, James M., 4,176,613, Cl. 114-67.00A.

Hore, Donald L., to Rotork Limited. Actuators. 4,177,395, Cl. 310-39.000.

Horiba, Ltd.: *See—*
Imaki, Masakatu; Hagiwara, Hidehiko; and Usui, Seiji, 4,177,126, Cl. 204-195.00F.

Horowitz, Alexandre: *See—*
Kymmell, Georg R. W.; Horowitz, Alexandre; and van der Hoorn, Rudolf J. G. A., 4,176,538, Cl. 72-110.000.

Horsma, David A.; Lyons, Bernard J.; and Smith-Johannsen, Robert, to Raychem Corporation. Layered self-regulating heating article. 4,177,376, Cl. 219-553.000.

Horton, James B. Drive system for deep well pump. 4,176,520, Cl. 60-369.000.

Horwitt, Laurence G.; and Mattis, Donald J., to Sun Chemical Corporation. Automatic electric cigar lighter. 4,177,374, Cl. 219-265.000.

Hounsfield, Godfrey N., to E M I Limited. Radiography. 4,177,382, Cl. 250-445.00T.

Hovey, Thomas C. Gas scavenger system. 4,176,666, Cl. 128-205.240.

Howlett, Donald L., to Texaco Inc. Floating point playback system. 4,177,457, Cl. 340-347.0DA.

Hromatka, Otto; Binder, Dieter; Pfister, Rudolf; and Zeller, Paul, to Hoffman-La Roche Inc. Thienothiazine derivatives. 4,177,193, Cl. 549-64.000.

Hubert, Gustav, to Notifier Company. Triggering device for combustion detector. 4,176,618, Cl. 116-102.000.

Hudson, George S.: *See—*
McClure, John W.; and Hudson, George S., 4,176,547, Cl. 73-136.00R.

Hudson, James A., Jr.; Levandoski, Raymond A.; and Long, Allen K., to Western Electric Co. Inc. Method and apparatus for controlling the filling of a cable. 4,177,097, Cl. 156-48.000.

Hueschens, Rolf: *See—*
Liepmann, Hans; Hueschens, Rolf; Milkowski, Wolfgang; Zeugner, Horst; Heinemann, Henning; Wolf, Klaus-Ullrich; Hell, Insa; and Hempel, Reinhard, 4,177,287, Cl. 424-285.000.

Huesing, Juergen; and Lampe, Hans H., to International Business Machines Corporation. Apparatus for monitoring and checking processor operation sequences. 4,176,781, Cl. 235-304.000.

Huggins, Jack G. Weather proof sandwich panel floor attachment device. 4,176,504, Cl. 52-61.000.

Hughes, Francis H.; Morton, Kenneth O.; LeMere, Roger; and Brown, Fred A., III, to Cluett, Peabody & Co., Inc. Method and apparatus for handling, positioning and assembling fabric plies. 4,176,832, Cl. 271-10.000.

Hughes, George C., to Textron Inc. Relay pilot regulator. 4,176,677, Cl. 137-488.000.

Hungerbach, Paul, to Thyssen Schachtbau GmbH. Bulk-storage receptacle with helical chute. 4,176,997, Cl. 414-299.000.

Hunt Manufacturing Co.: *See—*
Godfrey, Steven W., 4,176,753, Cl. 211-182.000.

Hunt, Peter: *See—*
Nedelec, Lucien; Frechet, Daniel; Dumont, Claude; and Hunt, Peter, 4,177,292, Cl. 424-330.000.

Hunter, Don L.; and Belles, Wayne S., to United States Borax & Chemical Corporation. Herbicidal benzimidazoles. 4,177,057, Cl. 71-92.000.

Hunter, John P., Jr.: *See—*
Patterson, Thomas K.; Mitchell, William O.; Smith, Donald H.; and Hunter, John P., Jr., 4,176,566, Cl. 83-29.000.

Huruhashi, Mikio: *See—*
Kozuka, Kazuhiro; Yamamoto, Shin; Huruhashi, Mikio; Iwaki, Katsutaro; and Asari, Susumu, 4,177,366, Cl. 200-19.0DR.

Hutchins, Clement A., to Bolton-Emerson, Inc. Dicer with soft feed apparatus. 4,176,570, Cl. 83-355.000.

Hutchins, Ned M.: *See—*
Studebaker, Irving G.; and Hutchins, Ned M., 4,176,882, Cl. 299-2.000.

Hyars, Claude: *See—*
Griner, Henry; Griner, Wade; Hyars, Claude; and Sweat, Tommy, 4,176,509, Cl. 56-27.500.
Griner, Henry; Griner, Wade; Hyars, Claude; and Sweat, Tommy, 4,176,510, Cl. 56-27.500.

Hyde, Glenn F.: *See—*
Cromwell, John E.; Herbert, Nicholas; and Hyde, Glenn F., 4,176,434, Cl. 29-156.630.

Iannuzzi, Giulio; deMartiis, Carlo C.; Del Bo, Vittorio; and Gandolfi, Luciano, to SGS-ATES Componenti Elettronici S.p.A. Method of connecting semiconductor structure to external circuits. 4,176,443, Cl. 29-589.000.

Ichikawa, Kiyoshi: *See—*
Yamada, Shigeru; and Ichikawa, Kiyoshi, 4,176,577, Cl. 84-1.010.

Ichikawa, Toshiji; and Minoo, Osamu, to Terumo Corp. Polyvinyl chloride series resin medical product implements and method of manufacturing the same using siloxane oil additive. 4,177,182, Cl. 260-29.1SB.

Ida, Edward S., to Du Pont de Nemours, E. I., and Company. Constant amplitude control of electromechanical oscillators. 4,177,434, Cl. 331-27.000.

Ii, Akira: *See—*
Yamanaka, Minoru; and Ii, Akira, 4,177,224, Cl. 261-39.00A.

Ikeda, Takatoshi, to Hitachi, Ltd. Photoelectric converter apparatus. 4,177,449, Cl. 340-146.3AG.

Ikeda, Takeshi: *See—*
Ueno, Yoshio; Ikeda, Takeshi; and Isozaki, Masaru, 4,177,237, Cl. 264-296.000.

Ikeda, Tomoaki: *See—*
Ono, Yoshihiro; Harada, Shigeo; Mizobuchi, Yuzo; and Ikeda, Tomoaki, 4,177,072, Cl. 430-302.000.

Ikekawa, Tetsuro: *See—*
Sakakida, Koji; and Ikekawa, Tetsuro, 4,177,108, Cl. 435-74.000.

Ikezawa, Harumi: *See—*
Umemura, Sumio; Ohdan, Kyoji; Sakai, Fumihiko; Bando, Yasuo; and Ikezawa, Harumi, 4,177,161, Cl. 252-435.000.

Illinois Tool Works Inc.: *See—*
Naranjo, George, 4,177,359, Cl. 179-98.000.

Imaki, Masakatu; Hagiwara, Hidehiko; and Usui, Seiji, to Horiba, Ltd. Reference electrode. 4,177,126, Cl. 204-195.00F.

Imperial Chemical Industries Limited: *See—*
Chinchen, Godfrey C., 4,177,252, Cl. 423-656.000.
Davies, George E.; and Janata, Jiri, 4,177,253, Cl. 424-1.000.
Denny, Patrick J.; Harrison, David L.; and Stacey, Martyn H., 4,177,168, Cl. 252-470.000.

Imura, Toshinori, to Minolta Camera Kabushiki Kaisha. Camera with self-contained flash device. 4,176,930, Cl. 354-59.000.

Ina, Toshikazu: *See—*
Kawai, Hisasi; and Ina, Toshikazu, 4,176,629, Cl. 123-32.0EC.

Inagaki, Takefumi: *See—*
Furukawa, Yasuo; Goto, Yoshiro; and Inagaki, Takefumi, 4,177,379, Cl. 250-306.000.

Inauen Maschinen AG: *See—*
Landolt, Bruno, 4,176,506, Cl. 53-86.000.

Indicon Inc.: *See—*
Citrin, Paul S., 4,176,671, Cl. 137-1.000.

Industra Products, Inc.: *See—*
Walker, Robert G., 4,176,444, Cl. 29-596.000.

Industrial Sales & Marketing Corporation: *See—*
Rich, Brett, 4,176,789, Cl. 238-8.000.

Ingersoll-Rand Company: *See—*
Gardner, James F., 4,176,983, Cl. 404-117.000.

Ingram, James R., Jr.; and Kiesel, George A., to Recognition Equipment Incorporated. Gate device. 4,176,855, Cl. 235-480.000.

Inoue, Akio; Kobayashi, Tadahiro; and Iwasa, Toshio, to Asahi Kasei Kogyo Kabushiki Kaisha. Dried porous acrylonitrile polymer membrane, process for producing same and separators made therefrom. 4,177,150, Cl. 210-500.00M.

Inoue, Nobumasa: *See—*
Akai, Norio; Inoue, Nobumasa; and Ohtani, Kazuo, 4,176,847, Cl. 274-39.00R.

Inoue, Takeshi: *See—*
Sawada, Takeshi; and Inoue, Takeshi, 4,176,539, Cl. 72-178.000.

Insley, Gene I.: *See—*
Cairo, Anthony C.; Tillmann, Ditmar K.; and Insley, Gene I., 4,176,903, Cl. 339-147.00R.

Institut Elektrosvarki Imeni E.O. Patona Akademii Nauk Ukrainskoi SSR: *See—*
Paton, Boris E.; Medovar, Boris I.; Tsukanov, Georgy E.; Bogachenko, Alexei G.; Artamonov, Viktor L.; Timashov, Grigory A.; Shtanko, Jury P.; Marchenko, Alexandr M.; Fedorovsky, Boris B.; Kumysh, Ilya I.; Chepurnoi, Anatoly D.; Saenko, Vladimir Y.; and Semin-Vadov, Gennady M., 4,177,058, Cl. 75-10.00C.

Instrument Systems Corporation: *See—*
Weitz, Harry, 4,177,498, Cl. 361-360.000.

Interlego A.G.: *See—*
Dideriksen, Erling T., 4,176,493, Cl. 46-23.000.

International Business Machines Corporation: *See—*
Balasubramanian, Peruvemba S.; and Greenspan, Stephen B., 4,177,452, Cl. 340-166.00R.
Bate, Geoffrey; and Dunn, Larry P., 4,177,442, Cl. 335-284.000.
Brayton, Robert K., 4,177,448, Cl. 340-146.3AE.
Brueckner, Karl H.; Farel, Charles A.; and Irsik, Johnnie F., 4,177,418, Cl. 323-56.000.
Christopher, Robert J.; and Schaaf, Robert L., 4,177,433, Cl. 330-265.000.
DeBoskey, Wentzle R.; and Sebrosky, Robert A., 4,176,975, Cl. 400-124.000.
Fleisher, Harold; and Hong, Se J., 4,177,355, Cl. 178-22.000.
Hoffman, Roy L.; Kempke, William G.; McCullough, John W.; Soltis, Frank G.; and Turner, Richard T., 4,177,513, Cl. 364-200.000.
Huesing, Juergen; and Lampe, Hans H., 4,176,781, Cl. 235-304.000.

International Standard Electric Corporation: *See—*
Jahn, Emil, 4,177,491, Cl. 360-135.000.

Interox Chemicals Limited: *See—*
Hildon, Anthony M.; and Greenhalgh, Peter F., 4,177,196, Cl. 260-348.250.

Interpace Corporation: *See—*
Dunbar, David R.; and Balog, Edward J., Sr., 4,177,352, Cl. 174-1.000.

Inukai, Mitsuo: *See—*
Sasaki, Shiro; Yasumatsu, Jun; and Inukai, Mitsuo, 4,176,808, Cl. 242-107.100.

Irsik, Johnnie F.: *See—*
Brueckner, Karl H.; Farel, Charles A.; and Irsik, Johnnie F., 4,177,418, Cl. 323-56.000.

Irvin, Howard B.; Sherk, Fred T.; and Hoffman, Alfred A., Jr., to Phillips Petroleum Company. Method of removing acetylene and sulfur compounds from gases by absorption in dimethyl formamide. 4,177,250, Cl. 423-573.00G.

Ishida, Yoshio, to Hitachi, Ltd. Magnetron pole piece assembly. 4,177,402, Cl. 315-39.710.

Ishihara, Takeshi: *See—*
Kawakami, Hakuhei; Ishihara, Takeshi; and Hatada, Kenzo, 4,176,518, Cl. 58-38.00R.

Ishimaru, Hajime, to National Laboratory for High Energy Physics. Bakable multi-pins vacuum feedthrough. 4,176,901, Cl. 339-136.00M.

Isizuka, Hirosi: *See—*
Nakamura, Akio; and Isizuka, Hirosi, 4,177,141, Cl. 210-70.000.

Isley, John C. Tie down clamp for vehicle mounted camper housing. 4,176,830, Cl. 269-6.000.

Isozaki, Masaru: *See—*
Ueno, Yoshio; Ikeda, Takeshi; and Isozaki, Masaru, 4,177,237, Cl. 264-296.000.

Ito, Akira: *See—*
Yonemitsu, Eiichi; Miyamori, Hiroshi; Nawata, Takanari; Fujioka, Tomio; Ito, Akira; and Kobayashi, Makoto, 4,177,247, Cl. 423-515.000.

Ito, Fumio; Tsunekawa, Tokuichi; Taguchi, Tetsuya; and Harigaya, Isao, to Canon Kabushiki Kaisha. Exposure control device for a camera. 4,176,929, Cl. 354-29.000.

Ito, Yasuro; Kaga, Hideharu; Yamamoto, Yasuhiro; Kuroha, Kenji; and Hayakawa, Mitsutaka, to Yasuro Ito; and Taisei Corporation. Method and apparatus for weighing aggregates. 4,176,965, Cl. 366-8.000.

Ito, Yuji, to Canon Kabushiki Kaisha. Ophthalmoscopic system with a wide angle objective lens. 4,176,920, Cl. 351-7.000.

Itoh, Fumio: *See—*
Hata, Yukinori; Watanabe, Tsutomu; and Itoh, Fumio, 4,177,073, Cl. 430-188.000.

Itoh, Satoru: *See—*
Takenouchi, Mutsuo; Ozawa, Takashi; Wako, Syoji; and Itoh, Satoru, 4,177,487, Cl. 358-294.000.

Itoki Kosakusho Co., Ltd.: *See—*
Oku, Nobuyuki, 4,176,996, Cl. 414-273.000.

ITT Industries, Inc.: *See—*
Quere, Eugene M.; and Le Rolland, Pierre M., 4.176,446, Cl. 29-622.000.

Ivaldi, Raoul: *See—*
Boy, Aristide; Galy, Henri; Ivaldi, Raoul; and Passedroit, Hubert, 4,177,208, Cl. 260-504.00S.

Iwaki, Katsutaro: *See—*
Kozuka, Kazuhiro; Yamamoto, Shin; Huruhashi, Mikio; Iwaki, Katsutaro; and Asari, Susumu, 4,177,366, Cl. 200-19.0DR.

Iwasa, Toshio: *See—*
Inoue, Akio; Kobayashi, Tadahiro; and Iwasa, Toshio, 4,177,150, Cl. 210-500.00M.

Jackson, John L.: *See—*
Archibald, John L.; and Jackson, John L., 4,177,279, Cl. 424-267.000.

Jackson, Martin A., to Sheldahl, Inc. Unwind stand-roll brake. 4,176,805, Cl. 242-75.460.

Jaeger, C. Rene; and Blakely, Lawrence E., to DBX Inc. Signal enhancement system. 4,177,356, Cl. 179-1.0VL.

Jahn, Emil, to International Standard Electric Corporation. Clamping device for disk-shaped memory sheets. 4,177,491, Cl. 360-135.000.

Jahn, Walter, to JENAer Glaswerk Schott & Gen. Glass for the production of optical elements with refractive index gradients. 4,177,319, Cl. 428-410.000.

James D. Pauls, Ltd.: *See—*
Capra, Nicholas G.; and Antenore, Ronald L., 4,176,764, Cl. 222-135.000.

James, Rex L.: *See—*
Olander, Emil E., Jr.; James, Rex L.; Larson, Ivar W.; Covington, Wayne F.; Walden, Jack M.; Watson, Robert E.; Yockey, Francis J.; Wenninger, Fred, Jr.; and Russell, Homer C., 4,177,518, Cl. 364-710.000.

Janata, Jiri: *See—*
Davies, George E.; and Janata, Jiri, 4,177,253, Cl. 424-1.000.

Jankovics, Gabor: *See—*
Entzmann, Karl; Kalman, Gyorgy; Varga, Janos; Vecsei, Miklos; Jankovics, Gabor; and Kozicz, Laszlone, 4,177,052, Cl. 71-33.000.

Janoski, Edward J.; Mitchell, Richard E.; and Schneider, Abraham, to Suntech, Inc. Continuous process for conversion of dimethyldicyclopentadiene to endo-dimethyldicyclopentadiene, a missile fuel. 4,177,217, Cl. 585-253.000.

Jansons, Eric G.: *See—*
Ryan, Allen L.; Jansons, Eric G.; Halliburton, Ronald D.; and Pearson, James H., 4,176,844, Cl. 273-121.00A.

Jaouen, Jean-Yves, to Compagnie Industrielle des Telecommunications Cit-Alcatel. Device for detecting errors in a digital transmission system. 4,177,447, Cl. 340-146.1AB.

Japan Atomic Energy Research Institute: *See—*
Kumakura, Minoru; Yoshida, Masaru; and Kaetsu, Isao, 4,177,107, Cl. 435-176.000.

Jarmann, Adolf. Tool for removing and inserting bolts in connecting rods. 4,176,439, Cl. 29-427.000.

Jay, Pierre; and Bonhomme, Pierre, to Rhone-Poulenc Industries. Dielectric compositions comprising mixtures of polychlorinated benzenes and alkylaromatic hydrocarbons. 4,177,156, Cl. 252-66.000.

Jefferson Industries Company, The: *See—*
Dill, Terry A., 4,176,621, Cl. 119-20.000.

Jeffrey, Lawrence W.; and Jeffrey, Robert D. Arm-wrestling apparatus. 4,176,837, Cl. 273-1.00R.

Jeffrey, Robert D.: *See—*
Jeffrey, Lawrence W.; and Jeffrey, Robert D., 4,176,837, Cl. 273-1.00R.

JENAer Glaswerk Schott & Gen.: *See—*
Jahn, Walter, 4,177,319, Cl. 428-410.000.

Jenkins, Alfred D.; and Schade, Edward W., Jr., to NCR Corporation. Interrupt adapter for data processing systems. 4,177,515, Cl. 364-200.000.

Jernqvist, Ake S., to Alfa-Laval AB. Process for removing oxygen from and adding carbon dioxide to a liquid water. 4,177,044, Cl. 55-48.000.

Jewett, Gary L.: *See—*
Vanderkooi, William N.; and Jewett, Gary L., 4,177,210, Cl. 260-561.00N.

Jillie, Don W., Jr.: *See—*
Kroger, Harry; and Jillie, Don W., Jr., 4,177,476, Cl. 357-5.000.

Jirkovsky, Ivo L.: *See—*
Philipp, Adolf H.; and Jirkovsky, Ivo L., 4,177,284, Cl. 424-275.000.

Joffe, Kenneth L., to Wynn Oil Company. Flushing of liquid circulation systems. 4,176,708, Cl. 165-95.000.

Johann Wolf Gesellschaft m.b.H. KG: *See—*
Wolf, Johann, 4,176,622, Cl. 119-28.000.

John Wyeth & Brother Ltd.: *See—*
Archibald, John L.; and Jackson, John L., 4,177,279, Cl. 424-267.000.

Johns-Manville Corporation: *See—*
Gagin, Lawrence V., 4,177,077, Cl. 106-50.000.

Johnson Electric Industrial Manufactory Limited: *See—*
Wang, Patrick, 4,177,396, Cl. 310-68.00C.

Johnson, Herbert: *See—*
Gorini, Robert F.; Johnson, Herbert; and Sillars, Frederick S., 4,177,098, Cl. 156-80.000.

Johnson & Johnson: *See—*
Walts, John M., 4,177,171, Cl. 252-541.000.

Johnson, Matthey & Co., Limited: *See—*
Day, Joseph G., 4,177,059, Cl. 75-10.00R.

Johnson, Robert D. Skateboard truck with independent wheel suspension. 4,176,850, Cl. 280-87.04A.

Johnson, Willard L. Stack-type heat exchanger. 4,176,709, Cl. 165-99.000.
Johnson, William R., Jr.: *See—*
Van Auken, Thomas V.; Grubbs, Harvey J.; and Johnson, William R., Jr., 4,177,339, Cl. 526-314.000.
Johnston, Samuel A., to Bunker Ramo Corporation. Pressure sensor. 4,176,557, Cl. 73-708.000.
Jones, John W. D.: *See—*
Gibson, Harry; and Jones, John W. D., 4,176,546, Cl. 73-182.000.
Jones, Lawrence T.: *See—*
Sims, Anson; and Jones, Lawrence T., 4,176,492, Cl. 46-22.000.
Jones, Richard E., to Robertshaw Controls Company. Retrofit igniter. 4,177,034, Cl. 431-264.000.
Jones, Ronald B.: *See—*
Dickerson, Evelyn C.; and Jones, Ronald B., 4,176,415, Cl. 5-66.000.
Jones, Willard H. Releasable holder for boxes. 4,176,817, Cl. 248-313.000.
Jones, William A.: *See—*
Murtha, Timothy P.; Jones, William A.; and Zuech, Ernest A., 4,177,164, Cl. 252-455.00Z.
Jones, William R.: *See—*
Felton, Dale D.; and Jones, William R., 4,176,865, Cl. 285-373.000.
Josephs, Richard M., to Sperry Rand Corporation. Magnetic bubble lattice device. 4,177,297, Cl. 427-38.000.
Jouveinal S.A.: *See—*
Torossian, Dieran R.; Aubard, Gilbert G.; and Legeai, Jacky M., 4,177,268, Cl. 424-243.000.
Joy Manufacturing Company: *See—*
Goland, Yaacov, 4,177,047, Cl. 55-146.000.
Jude, Dennis W.; and Bell, Joseph S., to British Gas Corporation. Apparatus for arresting propagating fractures in pipelines. 4,176,691, Cl. 138-103.000.
Juliano, Joseph O.: *See—*
Ambrosini, Leonard R.; Juliano, Joseph O.; and Rarick, Charles H., 4,176,608, Cl. 102-216.000.
Julius Blum Gesellschaft m.b.H.: *See—*
Rock, Erich; and Mages, Bernhard, 4,176,422, Cl. 16-130.000.
Rock, Erich; and Mages, Bernhard, 4,176,424, Cl. 16-148.000.
Rock, Erich; and Mages, Bernhard, 4,176,496, Cl. 49-410.000.
Jundt, Werner; Sohner, Gerhard; Werner, Peter; and Roozenbeek, Herman, to Robert Bosch GmbH. Motor ignition system control circuit for maintaining energy storage in spark coil constant in wide speed range. 4,176,645, Cl. 123-148.00E.
Jyojiki, Masao: *See—*
Nakamura, Kazuo; and Jyojiki, Masao, 4,176,928, Cl. 354-25.000.
K. K. Pollution Preventing Research Laboratory: *See—*
Ando, Wataru; and Watanabe, Kazuo, 4,177,121, Cl. 204-158.00R.
K-Shox, Inc.: *See—*
Case, Richard W., 4,176,714, Cl. 166-72.000.
Kabushiki Kaisha Kawai Gakki Seisakusho: *See—*
Murakami, Keiji, 4,176,576, Cl. 84-1.010.
Nogimura, Tsunehisa, 4,176,574, Cl. 84-1.010.
Kabushiki Kaisha Komatsu Seisakusho: *See—*
Kanai, Seikichi; and Komiyama, Kunihiko, 4,176,628, Cl. 123-32.00A.
Kabushiki Kaisha Sato: *See—*
Sato, Yo, 4,176,600, Cl. 101-111.000.
Kabushiki Kaisha Sato Kenkyusho: *See—*
Sato, Yo, 4,176,603, Cl. 101-291.000.
Kabushiki-Kaisha Tokai-Rika-Denki-Seisakusho: *See—*
Sasaki, Shiro; Yasumatsu, Jun; and Inukai, Mitsuo, 4,176,808, Cl. 242-107.100.
Kabushiki Kaisha Toyota Chuo Kenkyusho: *See—*
Kozuka, Kazuhiro; Yamamoto, Shin; Huruhashi, Mikio; Iwaki, Katsutaro; and Asari, Susumu, 4,177,366, Cl. 200-19.0DR.
Kaetsu, Isao: *See—*
Kumakura, Minoru; Yoshida, Masaru; and Kaetsu, Isao, 4,177,107, Cl. 435-176.000.
Kaga, Hideharu: *See—*
Ito, Yasuro; Kaga, Hideharu; Yamamoto, Yasuhiro; Kuroha, Kenji; and Hayakawa, Mitsutaka, 4,176,965, Cl. 366-8.000.
Kaiser, Fay E., Jr., to U.S. Aviex Corp. Starter fluid for internal combustion engines. 4,177,040, Cl. 44-52.000.
Kaiser, Reinhold: *See—*
Hintzmann, Kurt; Kaiser, Reinhold; Link, Wolfgang; Minner, Willy; Mutz, Dieter; Salomon, Manfred; and Wingert, Arnim, 4,177,480, Cl. 357-84.000.
Kali-Chemie Pharma GmbH: *See—*
Liepmann, Hans; Hueschens, Rolf; Milkowski, Wolfgang; Zeugner, Horst; Heinemann, Henning; Wolf, Klaus-Ullrich; Hell, Insa; and Hempel, Reinhard, 4,177,287, Cl. 424-285.000.
Kalish, Stanley. Impregnated bandage. 4,176,664, Cl. 128-156.000.
Kalman, Gyorgy: *See—*
Entzmann, Karl; Kalman, Gyorgy; Varga, Janos; Vecsei, Miklos; Jankovics, Gabor; and Kozicz, Laszlone, 4,177,052, Cl. 71-33.000.
Kaltenbach & Voigt GmbH & Co.: *See—*
Lohn, Gerd, 4,177,024, Cl. 418-16.000.
Kalter, Werner: *See—*
Elsner, Wolfgang; Kalter, Werner; Michel, Rolf; and Moslener, Jorn, 4,176,535, Cl. 72-10.000.
Kamiya, Tamotsu; and Miyao, Shigeru, to Toyota Jidosha Kogyo Kabushiki Kaisha. Pneumatic system for smoothing discharge pressure from air. 4,177,023, Cl. 417-540.000.
Kamiyama, Satoru: *See—*
Siozawa, Nobuo; Kikuchi, Uhee; Kimura, Suguru; Todoroki, Nobuaki; Yasukawa, Jun-ichi; and Kamiyama, Satoru, 4,177,123, Cl. 204-181.00C.
Kamiyama, Toshibumi; and Miyamoto, Kunito, to Matsushita Electric Industrial Co., Ltd. Frost detector. 4,176,524, Cl. 62-140.000.
Kamyr, Incorporated: *See—*
Laakso, Oliver A.; and Sherman, Michael I., 4,177,105, Cl. 162-237.000.
Kan, Peter T.: *See—*
Schaaf, Robert L.; Kan, Peter T.; and Cenker, Moses, 4,177,205, Cl. 260-453.0AM.
Kanai, Seikichi; and Komiyama, Kunihiko, to Kabushiki Kaisha Komatsu Seisakusho. Combustion chamber for an internal combustion engine of direct injection type. 4,176,628, Cl. 123-32.00A.
Kanai, Teijiro: *See—*
Yoshida, Akihiko; Koaki, Akira; Nakano, Takahumi; Miyake, Mitsunao; Kanai, Teijiro; and Misono, Izumi, 4,176,605, Cl. 101-451.000.
Kanao, Mitsuhiro. Internal combustion engine. 4,176,631, Cl. 123-73.0PP.
Kanebo, Ltd.: *See—*
Mishima, Takao; Semba, Shoji; Ogata, Kiichi; and Funahashi, Osamu, 4,176,532, Cl. 68-19.000.
Kania, Charles M.: *See—*
Das, Suryya K.; and Kania, Charles M., 4,177,178, Cl. 260-29.40A.
Kannegiesser, Reinhard: *See—*
Panknin, Walter; Finsterwalder, Kurt; Kannegiesser, Reinhard; and Bassler, Hans, 4,176,536, Cl. 72-91.000.
Kappler, Gudrun: *See—*
Schulz, Manfred; and Kappler, Gudrun, 4,176,877, Cl. 296-208.000.
Kapps, Manfred: *See—*
Mitschke, Karl-Heinz; Niederprum, Hans; and Kapps, Manfred, 4,177,332, Cl. 521-98.000.
Karlin, James H., to Harris Corporation. Illuminated keyboard. 4,177,501, Cl. 362-26.000.
Karlovitz, Bela, to Toyota Motor Company, Ltd. Emission control. 4,176,649, Cl. 123-191.0SP.
Karlson, Harald E.: *See—*
Goldsworthy, William B.; and Karlson, Harald E., 4,177,029, Cl. 425-112.000.
Karpati, Egon: *See—*
Tuba, Zoltan; Marsai, Maria; Biro, Katalin; Szporny, Laszlo; Karpati, Egon; and Szeberenyi, Szabolcs, 4,177,190, Cl. 260-239.500.
Karsten, Werner: *See—*
Erwien, Helmut; and Karsten, Werner, 4,176,884, Cl. 299-34.000.
Karyagin, Viktor F.: *See—*
Bezvulyak, Anatoly S.; Gelfand, Ilya M.; Torchinsky, Efim M.; Pushkin, Sergei B.; Vedernikov, Rudolf K.; Kulachenkov, Gennady P.; Tkachuk, Petr F.; and Karyagin, Viktor F., 4,176,952, Cl. 356-47.000.
Kasahara, Shigekazu: *See—*
Kurihara, Kenji; Kasahara, Shigekazu; and Suzuki, Takashi, 4,177,179, Cl. 260-29.6NR.
Kassos, Thomas G. Aquarium-terrarium tank. 4,176,620, Cl. 119-5.000.
Kasubuchi, Takeshi; Ozawa, Kaoru; and Hara, Takeo, to Sharp Kabushiki Kaisha. Electronic control assembly mounted on a flexible carrier and manufacture thereof. 4,177,519, Cl. 364-712.000.
Katakabe, Noboru; Yamaguchi, Isao; and Onishi, Masaru, to Matsushita Electric Industrial Co., Ltd. Electrophotographic color image producing apparatus. 4,176,940, Cl. 355-10.000.
Katkov, Jury V., to Moskovsky Automobilny Zavod imeni I.A. Likhacheva (Proizvodstvennoe Obiedinenie Zil). Piston stroke adjusting arrangement for disc-type friction clutches and brakes. 4,176,738, Cl. 192-111.00R.
Kato, Akio: *See—*
Kobayashi, Mituki; Awao, Takao; Mizusaki, Yujiro; Sato, Kunio; Kato, Akio; and Mituishi, Hisao, 4,177,069, Cl. 75-213.000.
Kato, Osamu: *See—*
Uemura, Seiichi; Yamamoto, Syunichi; Hirose, Takao; Takashima, Hiroaki; Kato, Osamu; and Nagi, Minoru, 4,177,132, Cl. 208-22.000.
Kato, Takashi: *See—*
Nakamura, Norihiko; Kato, Takashi; and Kobayashi, Tatsuo, 4,176,646, Cl. 123-148.00E.
Kavli, Fred: *See—*
Bell, Robert L.; Willing, Robert; and Kavli, Fred, 4,177,496, Cl. 361-283.000.
Kavlico Corporation: *See—*
Bell, Robert L.; Willing, Robert; and Kavli, Fred, 4,177,496, Cl. 361-283.000.
Kawai, Hisasi; and Ina, Toshikazu, to Nippon Soken, Inc. Electric control method for fuel injection and ignition timing. 4,176,629, Cl. 123-32.0EC.
Kawai Musical Instrument Mfg. Co. Ltd.: *See—*
Deutsch, Ralph, 4,176,573, Cl. 84-1.010.
Kawakami, Hakuhei; Ishihara, Takeshi; and Hatada, Kenzo, to Matsushita Electric Industrial Co., Ltd. Electronic clock having audible time indication. 4,176,518, Cl. 58-38.00R.
Kawamura, Naoto: *See—*
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Kawase, Suminosuke, to Tokyo Kogaku Kikai Kabushiki Kaisha. Finder system for photographing apparatus. 4,176,937, Cl. 354-62.000.

Kaye, Morton. Opto-mechanical measuring system. 4,176,460, Cl. 33-174.00L.

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Bossert, Friedrich; Wehinger, Egbert; Heise, Arend; Kazda, Stanislav; Stoepel, Kurt; Towart, Robertson; Vater, Wulf; and Schlossmann, Klaus, 4,177,278, Cl. 424-266.000.

Kazmierowicz, Casimir W. Method and apparatus for obtaining the temperature profile of a kiln. 4,176,554, Cl. 73-341.000.

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Buschermohle, Gregor, 4,177,035, Cl. 432-121.000.

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Kelso, Richard C.; and Kelso, Eileen E., 4,176,684, Cl. 137-562.000.

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Kendall Company, The: *See—*
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Kenmotsu, Nobuhiro: *See—*
Hayashi, Masaaki; Tsuneta, Kazuyoshi; Takada, Hiroshi; Kenmotsu, Nobuhiro; and Sasaki, Hiroharu, 4,177,174, Cl. 260-18.0PN.

Kennedy, Ronald J.: *See—*
Wright, Ronald E.; Kennedy, Ronald J.; and Hiatt, Sidney A., 4,176,414, Cl. 5-13.000.

Kennedy, William S., to Acurex Corporation. Photovoltaic concentrator. 4,177,083, Cl. 136-89.0CA.

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Poggemiller, Erhard; and Sweet, Ralph, 4,176,721, Cl. 172-4.000.

Kephart, John W., Jr. Fluid operated rotor. 4,177,014, Cl. 416-197.00A.

Keranen, John J., to Eaton Corporation. Interlocking and maintaining attachment for two standard pushbuttons. 4,177,363, Cl. 200-5.00B.

Kerby, Robert C., to Cominco Ltd. Bipolar refining of lead. 4,177,117, Cl. 204-114.000.

Kerr-McGee Corporation: *See—*
Rhodes, Donald E.; Baldwin, Roger A.; and Davis, Robert E., 4,177,134, Cl. 208-177.000.
Rhodes, Donald E., 4,177,135, Cl. 208-177.000.

Kessler, Theodore P., to Timron, Inc. Machine for winding pile fabric on a reel. 4,176,803, Cl. 242-67.10R.

Khan, Karrar A.; and Cook, Brian, to Beecham Group Limited. Orally administrable pharmaceutical composition. 4,177,254, Cl. 424-16.000.

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Krupman, Leonid I.; Yaroslavtsev, Jury G.; Sochnev, Alexandr E.; Shamil, Jury P.; Khitrik, Abram I.; Antipenko, Grigory I.; Smetanin, Jury G.; Samsonov, Albert N.; Ljudkovsky, Vadim M.; Pokrass, Leonid M.; Kurdjukov, Anatoly A.; Ofengenden, Abram M.; and Zhitnik, Georgy G., 4,177,070, Cl. 75-257.000.

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Gebel, Iosif D.; Zykov, Arkady A.; Nefedov, Askold I.; Parshikov, Viktor I.; and Khrolenko, Viktor F., 4,176,461, Cl. 33-178.00D.

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Zagorodnaya, Galina A.; Vartanian, Gurgen P.; Khutoretsky, Garri M.; and Fridman, Vladimir M., 4,177,398, Cl. 310-270.000.

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Ingram, James R., Jr.; and Kiesel, George A., 4,176,855, Cl. 235-480.000.

Kiessling, Werner: *See—*
Weiss, Rudolf; Kiessling, Werner; and Wiedemann, Otto, 4,176,938, Cl. 354-275.000.

Kikuchi, Uhee: *See—*
Siozawa, Nobuo; Kikuchi, Uhee; Kimura, Suguru; Todoroki, Nobuaki; Yasukawa, Jun-ichi; and Kamiyama, Satoru, 4,177,123, Cl. 204-181.00C.

Kilcher-Chemie AG: *See—*
Prolss, Ludwig, 4,177,228, Cl. 264-24.000.

Kim, Dae K.: *See—*
Feinstein, Allen I.; Bertolacini, Ralph J.; and Kim, Dae K., 4,177,219, Cl. 585-489.000.

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Kimura, Suguru: *See—*
Siozawa, Nobuo; Kikuchi, Uhee; Kimura, Suguru; Todoroki, Nobuaki; Yasukawa, Jun-ichi; and Kamiyama, Satoru, 4,177,123, Cl. 204-181.00C.

King, Christopher F.: *See—*
Cudby, Joseph W.; King, Christopher F.; and Syred, Nicholas, 4,176,769, Cl. 222-591.000.

King, Colin M.; Goddard, Michael R.; and Murray, Dudley C., to Pains-Wessex Limited. Pyrotechnic devices. 4,176,606, Cl. 102-37.400.

King, Olin B., to SCI Systems, Inc. Rotary electrical printer and method automatic blackness control for rotary electrical printer. 4,177,472, Cl. 346-162.000.

King Seeley Thermos Company: *See—*
Steeves, Robert W., 4,177,310, Cl. 428-216.000.
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Kinney, Robert E.: *See—*
Heiba, El-Ahmadi I.; Kinney, Robert E.; and Stead, George E., 4,177,192, Cl. 260-326.220.

Kirk, Clair F.; and Kirk, Samuel A. Hydraulic inertia centrifugal catalytic desalination device. 4,176,779, Cl. 233-32.000.

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Kirkwood, John M.: *See—*
Talbott, John W.; and Kirkwood, John M., 4,176,798, Cl. 241-39.000.

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Kissick, Thomas P.: *See—*
Wade, Peter C.; Vogt, B. Richard; and Kissick, Thomas P., 4,177,191, Cl. 548-212.000.

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Yamada, Seiji; Yoshiyama, Ichiro; and Kitaura, Mashio, 4,176,955, Cl. 356-222.000.

Klank, Otto, to Licentia Patent-Verwaltung-G.m.b.H. Circuit arrangement for amplifying oscillator oscillations and converting same to r[illegible]angular signals. 4,177,428, Cl. 325-455.000.

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Klatt, Jochen: *See—*
Diegelmann, Winfried; Schardt, Gunter; Klatt, Jochen; and Grolz, Heinz, 4,177,316, Cl. 428-367.000.

Kleber, Rolf; and Cuntze, Ulrich, to Hoechst Aktiengesellschaft. Process for improving the sliding properties of linear polyester material in spinning operations. 4,177,231, Cl. 264-130.000.

Klein, Schanzlin & Becker Aktiengesellschaft: *See—*
Florjancic, Dusan; and Matthias, Heinz-Bernd, 4,177,008, Cl. 415-206.000.

Klippan France, S.A.: *See—*
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Knaggs, Edward A.: *See—*
Nussbaum, Marvin L.; and Knaggs, Edward A., 4,177,207, Cl. 260-504.00R.

Knight, Ronald E., to Wallace Knight Limited. Apparatus for treating a sheet material with radiation. 4,177,383, Cl. 250-492.00R.

Knittel, Siegfried, to Ernst Leitz Wetzlar GmbH. Methods of and a circuit for monitoring the amplitude of sine wave-shaped signals. 4,177,424, Cl. 324-102.000.

Knor, Bernhard; Payrhammer, Bernd; and Treiber, Helmut, to AGFA-Gevaert, A.G. Determination of extreme density values of a transported strip of photographic originals. 4,176,964, Cl. 356-444.000.

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Koaki, Akira: *See—*
Yoshida, Akihiko; Koaki, Akira; Nakano, Takahumi; Miyake, Mitsunao; Kanai, Teijiro; and Misono, Izumi, 4,176,605, Cl. 101-451.000.

Kobayashi, Makoto: *See—*
Yonemitsu, Eiichi; Miyamori, Hiroshi; Nawata, Takanari; Fujioka, Tomio; Ito, Akira; and Kobayashi, Makoto, 4,177,247, Cl. 423-515.000.

Kobayashi, Mituki; Awao, Takao; Mizusaki, Yujiro; Sato, Kunio; Kato, Akio; and Mituishi, Hisao, to Showa Denko K.K. Process for manufacturing sintered compacts of aluminum-base alloys. 4,177,069, Cl. 75-213.000.

Kobayashi, Nobuyuki: *See—*
Hayashi, Kiyoshige; Nakaniwa, Mikio; Kobayashi, Nobuyuki; Yamamoto, Minoru; and Hase, Yoshihiko, 4,177,133, Cl. 208-50.000.

Kobayashi, Tadahiro: *See—*
Inoue, Akio; Kobayashi, Tadahiro; and Iwasa, Toshio, 4,177,150, Cl. 210-500.00M.

Kobayashi, Tatsuo: *See—*
Nakamura, Norihiko; Kato, Takashi; and Kobayashi, Tatsuo, 4,176,646, Cl. 123-148.00E.

Kochan, Kenneth, to Automated Donut Systems, Inc. Doughnut frying apparatus. 4,176,590, Cl. 99-405.000.

Kocher, Robert C.; and Piorkow, Alfred, to GTE Laboratories Incorporated. Laser scanner for photolithography of slotted mask color cathode ray tubes. 4,176,925, Cl. 354-1.000.

Kodama Taiwan Industrial Co., Ltd.: *See—*
Wang, Wan-Ching, 4,176,734, Cl. 190-49.000.

Kodama, Yukuo, to Nippon Electric Co., Ltd. Arrangement for putting an electronic timepiece right with minute indication advanced at first. 4,176,516, Cl. 58-23.00R.

Koester, Eberhard: *See—*
Schoenafinger, Eduard; Deigner, Paul; Koester, Eberhard; Ohlinger, Manfred; Schaefer, Dieter; Stumpfi, Werner; Amort, Juergen; Seiler, Claus-Dietrich; Nestler, Heinz; and Ambros, Otto, 4,177,317, Cl. 428-405.000.

Kokusan Denki Co., Ltd.: *See*—
Yukawa, Hideki, 4,177,415, Cl. 322-28.000.
Kolbel, Herbert; and Tillmetz, Klaus D., to Schering Aktiengesellschaft. Process for the production of hydrocarbons and oxygen-containing compounds and catalysts therefor. 4,177,203, Cl. 260-449.60R.
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Komorowski, Alexander F. Nitrogen-heat separator furnace. 4,176,656, Cl. 126-400.000.
Kondelikova, Jaroslava: *See*—
Kubanek, Vladimir; Basarova, Gabriela; Kralicek, Jaroslav; Skach, Josef; Fencl, Zdenek; Budin, Jiri; Kondelikova, Jaroslava; and Sittler, Eduard, 4,177,295, Cl. 426-330.300.
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Koninklijke Adriaan Volker Baggermaatschappij B.V.: *See*—
Alkema, Jan, 4,176,885, Cl. 406-128.000.
Koninklijke Emballage Industrie Van Leer B. V.: *See*—
Leibinsohn, Saul H., 4,176,683, Cl. 137-559.000.
Konyves, Imre: *See*—
Fex, Hans; Hansen, Bertil; Holmberg, Krister; Hogberg, Bertil; and Konyves, Imre, 4,177,269, Cl. 424-243.000.
Kooi, Edward, to Arvey Corporation. Gusset pouch with integral seal support and method of making same. 4,176,746, Cl. 206-438.000.
Kopczynski, Marian: *See*—
Bielecki, Marek; Bogdanski, Andrzej; Buxakowski, Andrzej; Chudzinski, Janusz; Glogowski, Andrzej; Kopczynski, Marian; Krolikowski, Andrzej; Kryszewski, Jozef; Moczulski, Zdzislaw; Ochocki, Wlodzimierz; Pomorski, Aleksander; Rumatowski, Karol; Sawicki, Janusz; Szostakowski, Henryk; Warowny, Tadeusz; Wisniewski, Teofil; and Wozniak, Antoni, 4,176,624, Cl. 123-32.0EA.
Koppers Company, Inc.: *See*—
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Kornhauser, Murray, to Safety Consultants. Energy absorbing bumper system. 4,176,858, Cl. 280-734.000.
Kossoff, George; and Robinson, David E., to Commonwealth of Australia, The. Ultrasonic echogram display. 4,176,658, Cl. 128-660.000.
Kotera, Nobuo; Oi, Tetsu; and Nishida, Takashi, to Hitachi, Ltd. Method and apparatus for laser zone melting. 4,177,372, Cl. 219-121.00L.
Kotera, Nobuo: *See*—
Shigeta, Junji; Oi, Tetsu; Kotera, Nobuo; Nakashima, Muneyasu; and Miyamoto, Nobuo, 4,177,298, Cl. 427-85.000.
Kotke, Klaus D.: *See*—
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Koutsky, L. John, to Sears Manufacturing Company. Armrest structure. 4,176,878, Cl. 297-115.000.
Koyama, Masaoki: *See*—
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Koyama, Teruo: *See*—
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Kozicz, Laszlone: *See*—
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Kozuka, Kazuhiro; Yamamoto, Shin; Huruhashi, Mikio; Iwaki, Katsutaro; and Asari, Susumu, to Nippondenso Co., Ltd.; and Kabushiki Kaisha Toyota Chuo Kenkyusho. Noise suppression electrode arrangement with a rotor of dielectric material. 4,177,366, Cl. 200-19.0DR.
Kozuki, Susumu; Uchidoi, Masanori; Date, Nobuaki; Shimizu, Masami; Aizawa, Hiroshi; and Takishima, Yoshiyuki, to Canon Kabushiki Kaisha. Motor drive unit for a camera. 4,176,936, Cl. 354-38.000.
Kraft, Inc.: *See*—
Blaetz, Philip H., 4,176,970, Cl. 366-280.000.
Kraftwerk Union Aktiengesellschaft: *See*—
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Krakauer, Merrill: *See*—
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Kralicek, Jaroslav: *See*—
Kubanek, Vladimir; Basarova, Gabriela; Kralicek, Jaroslav; Skach, Josef; Fencl, Zdenek; Budin, Jiri; Kondelikova, Jaroslava; and Sittler, Eduard, 4,177,295, Cl. 426-330.300.
Kreis, Gerhard; August, Peter; and Wick, Manfred, to Consortium Fur Elektrochemische Industrie GmbH. Addition of Si-bonded hydrogen to an aliphatic multiple bond. 4,177,341, Cl. 528-15.000.
Kremer, Wolfgang: *See*—
Traenckner, Hans-Joachim; Goossens, John; Kremer, Wolfgang; and Kronke, Heinz, 4,177,172, Cl. 260-15.000.
Krigas, Thomas: *See*—
Rosenberg, Barnett; VanCamp, Loretta; and Krigas, Thomas, 4,177,263, Cl. 424-131.000.
Kroger, Harry; and Jillie, Don W., Jr., to Sperry Rand Corporation. Multiple weak-link SQUID with non-superconductive material weak-links. 4,177,476, Cl. 357-5.000.
Krolikowski, Andrzej: *See*—
Bielecki, Marek; Bogdanski, Andrzej; Buxakowski, Andrzej; Chudzinski, Janusz; Glogowski, Andrzej; Kopczynski, Marian; Krolikowski, Andrzej; Kryszewski, Jozef; Moczulski, Zdzislaw; Ochocki, Wlodzimierz; Pomorski, Aleksander; Rumatowski, Karol; Sawicki, Janusz; Szostakowski, Henryk; Warowny, Tadeusz; Wisniewski, Teofil; and Wozniak, Antoni, 4,176,624, Cl. 123-32.0EA.
Kromer, Heiner M.; and Ossman, John, to Haake, Inc. Three sectioned mixer having individual thermal controls. 4,176,968, Cl. 366-97.000.
Kronke, Heinz: *See*—
Traenckner, Hans-Joachim; Goossens, John; Kremer, Wolfgang; and Kronke, Heinz, 4,177,172, Cl. 260-15.000.
Kronogard, Sven O., to United Turbine AB & Co., Kommanditbolag. Gas turbine having a ceramic rotor. 4,176,519, Cl. 60-39.16R.
Kroon, Simon G., to U.S. Philips Corporation. Method of treating a monocrystalline body utilizing a measuring member consisting of a monocrystalline layer and an adjoining substratum of different index of refraction. 4,177,094, Cl. 148-175.000.
Kropa, Gomer E.: *See*—
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Kruger, Hans-Rudolf: *See*—
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Krulick, Steven E.: *See*—
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Krupman, Leonid I.; Yaroslavtsev, Jury G.; Sochnev, Alexandr E.; Shamil, Jury P.; Khitrik, Abram I.; Antipenko, Grigory I.; Smetanin, Jury G.; Samsonov, Albert N.; Ljudkovsky, Vadim M.; Pokrass, Leonid M.; Kurdjukov, Anatoly A.; Ofengenden, Abram M.; and Zhitnik, Georgy G. Exothermic slag-forming mixture. 4,177,070, Cl. 75-257.000.
Krupnick, Albert C.: *See*—
Roberts, Marion L.; Sharpe, Max H.; and Krupnick, Albert C., 4,177,325, Cl. 428-629.000.
Kruse, Larry W., to Standard Oil Company. Aromatics extraction process. 4,177,137, Cl. 208-321.000.
Kryszewski, Jozef: *See*—
Bielecki, Marek; Bogdanski, Andrzej; Buxakowski, Andrzej; Chudzinski, Janusz; Glogowski, Andrzej; Kopczynski, Marian; Krolikowski, Andrzej; Kryszewski, Jozef; Moczulski, Zdzislaw; Ochocki, Wlodzimierz; Pomorski, Aleksander; Rumatowski, Karol; Sawicki, Janusz; Szostakowski, Henryk; Warowny, Tadeusz; Wisniewski, Teofil; and Wozniak, Antoni, 4,176,624, Cl. 123-32.0EA.
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Kubo, Masaharu: *See*—
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Kuhlapparate GmbH SIBIR: *See*—
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Kulachenkov, Gennady P.: *See*—
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Kulsa, Peter: *See*—
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Kumakura, Minoru; Yoshida, Masaru; and Kaetsu, Isao, to Japan Atomic Energy Research Institute. Process for producing composition containing insolubilized enzyme and/or insolubilized bacterial cells. 4,177,107, Cl. 435-176.000.
Kumysh, Ilya I.: *See*—
Paton, Boris E.; Medovar, Boris I.; Tsukanov, Georgy E.; Bogachenko, Alexei G.; Artamonov, Viktor L.; Timashov, Grigory A.; Shtanko, Jury P.; Marchenko, Alexandr M.; Fedorovsky, Boris B.; Kumysh, Ilya I.; Chepurnoi, Anatoly D.; Saenko, Vladimir Y.; and Semin-Vadov, Gennady M., 4,177,058, Cl. 75-10.00C.
Kuno, Akira: *See*—
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Kuo, Han C., to Olin Corporation. Plated metallic cathode. 4,177,129, Cl. 204-290.00R.
Kurandt, Hans-Friedrich, to Veba-Chemie Aktiengesellschaft. Method for the production of phosphoric acid with high contents of fertilizer-nutrients. 4,177,053, Cl. 71-36.000.
Kurdjukov, Anatoly A.: *See*—
Krupman, Leonid I.; Yaroslavtsev, Jury G.; Sochnev, Alexandr E.; Shamil, Jury P.; Khitrik, Abram I.; Antipenko, Grigory I.; Smetanin, Jury G.; Samsonov, Albert N.; Ljudkovsky, Vadim M.; Pokrass, Leonid M.; Kurdjukov, Anatoly A.; Ofengenden, Abram M.; and Zhitnik, Georgy G., 4,177,070, Cl. 75-257.000.
Kurihara, Kenji; Kasahara, Shigekazu; and Suzuki, Takashi, to Toyo Soda Manufacturing Co., Ltd. Aqueous cold setting paint. 4,177,179, Cl. 260-29.6NR.
Kuroha, Kenji: *See*—
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Kuroishi, Shoji: *See*—
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Kuroyama, Toshinobu: *See—*
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Kuze, Yoshikazu. Sequence control system. 4,177,377, Cl. 235-419.000.
Kwon, Nathan J. Reel assembly for controlling cord winding in kite flying. 4,176,806, Cl. 242-96.000.
Kwon, Nathan J. Kite-flying control reel. 4,176,807, Cl. 242-96.000.
Kymmell, Georg R. W.; Horowitz, Alexandre; and van der Hoorn, Rudolf J. G. A., to Volvo Car B.V. Method and apparatus for the forming of metal endless belts from blanks of tubular material. 4,176,538, Cl. 72-110.000.
L. Schuler GmbH: *See—*
Panknin, Walter; Finsterwalder, Kurt; Kannegiesser, Reinhard; and Bassler, Hans, 4,176,536, Cl. 72-91.000.
Laakso, Oliver A.; and Sherman, Michael I., to Kamyr, Incorporated. Apparatus for delignifying and bleaching cellulose pulp. 4,177,105, Cl. 162-237.000.
Labes, Mortimer M., to Temple University. Fluorescent liquid crystal display. 4,176,918, Cl. 350-346.000.
Laboratoire L. Lafon: *See—*
Lafon, Louis, 4,177,290, Cl. 424-324.000.
Lacoste, Georges: *See—*
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L'Acqua, Vito: *See—*
Siclari, Francesco; Rossi, Pietro P.; Guaita, Cesare; and L'Acqua, Vito, 4,177,214, Cl. 260-601.00R.
Lafon, Louis, to Laboratoire L. Lafon. Acetamide derivatives. 4,177,290, Cl. 424-324.000.
Lafuze, David S., to Dresser Industries, Inc. Rotary bearing seal for drill bits. 4,176,848, Cl. 277-92.000.
Lage, Frederick A. Device for conditioning expended shotshells. 4,176,583, Cl. 86-24.000.
Lampe, Hans H.: *See—*
Huesing, Juergen; and Lampe, Hans H., 4,176,781, Cl. 235-304.000.
Lancaster, John T. Apparatus for playing a simulated golf game. 4,176,845, Cl. 273-245.000.
Landolt, Bruno, to Inauen Maschinen AG. Vacuum packing machine with tiltable roller stacking plate. 4,176,506, Cl. 53-86.000.
Landrith, James E.: *See—*
Breitenkam, Fred J.; and Landrith, James E., 4,176,941, Cl. 355-14.00R.
Lang, William H.: *See—*
Chang, Clarence D.; and Lang, William H., 4,177,202, Cl. 260-449.00R.
Lange, Gerhardt, to Messer Griesheim GmbH. Flame cutting arrangement. 4,176,828, Cl. 266-65.000.
Lanning, Michael E. Wrist support. 4,176,840, Cl. 273-54.00B.
Larson, Ivar W.: *See—*
Olander, Emil E., Jr.; James, Rex L.; Larson, Ivar W.; Covington, Wayne F.; Walden, Jack M.; Watson, Robert E.; Yockey, Francis J.; Wenninger, Fred, Jr.; and Russell, Homer C., 4,177,518, Cl. 364-710.000.
Lattmann, Werner; and Staheli, Paul, to Rieter Machine Works Ltd. Apparatus for separating opened fibre flocks from a transporting air stream. 4,176,988, Cl. 406-171.000.
Lau, Silvanus S.; Mayer, James W.; and Sigmon, Thomas W., to Hewlett-Packard Company, by Thomas W. Sigmon, a part interest. Method for producing a low defect layer of silicon-on-sapphire wafer. 4,177,084, Cl. 148-1.500.
Laubie, Michel: *See—*
Regnier, Gilbert; Canevari, Roger; Laubie, Michel; and Poignant, Jean-Claude, 4,177,272, Cl. 424-250.000.
Lauria, Francesco: *See—*
Doria, Gianfederico; Romeo, Ciriaco; Lauria, Francesco; Corno, Maria L.; Giraldi, Piernicola; and Tibolla, Marcello, 4,177,276, Cl. 424-263.000.
Doria, Gianfederico; Romeo, Giriaco; Lauria, Francesco; Corno, Maria L.; Giraldi, Piernicola; and Tibolla, Marcello, 4,177,286, Cl. 424-283.000.
Le Carbone Lorraine: *See—*
Sarrut, Jean P., 4,177,152, Cl. 252-2.000.
Le Material Telephonique: *See—*
Granet, Jacques R., 4,177,018, Cl. 417-338.000.
Le Cun, Alain: *See—*
Marchaix, Raymond; and Le Cun, Alain, 4,176,678, Cl. 137-493.000.
Lee, Chi-Long: *See—*
Homan, Gary R.; and Lee, Chi-Long, 4,177,322, Cl. 428-447.000.
Lee, George K. C.; and Lee, Wanda M. Grip-operated nail clipper. 4,176,449, Cl. 30-28.000.
Lee, Jack W.; and Voehringer, Charles A., to United Technologies Corporation. Method of remanufacturing turbine vane clusters for gas turbine engines. 4,176,433, Cl. 29-156.80B.
Lee, James A.; Madsen, Peter E.; and Hills, Ronald F., to United Kingdom Atomic Energy Authority. Manufacture of superconducting members. 4,177,087, Cl. 148-11.50R.
Lee, Wanda M.: *See—*
Lee, George K. C.; and Lee, Wanda M., 4,176,449, Cl. 30-28.000.
Leesona Corporation: *See—*
Barnes, William; Gerstenberg, Roy W.; Kropa, Gomer E.; and LeJeune, Roland A., 4,176,796, Cl. 241-30.000.
Leete, Bernard D., to General Electric Company. Method and control for maintaining optimum performance of HVDC power transmission systems at rectifier end during A. C. system fault. 4,177,507, Cl. 363-51.000.
Legeai, Jacky M.: *See—*
Torossian, Dieran R.; Aubard, Gilbert G.; and Legeai, Jacky M., 4,177,268, Cl. 424-243.000.
Leggett & Platt, Incorporated: *See—*
Wright, Ronald E.; Kennedy, Ronald J.; and Hiatt, Sidney A., 4,176,414, Cl. 5-13.000.
Lehmann, Hans-Juergen; Bietz, Rolf; and Wegner, Juergen, to Henkel Kommanditgesellschaft auf Aktien (Henkel KGaA). Aqueous cleaning concentrate for the cleaning of foodstuff. 4,177,294, Cl. 426-271.000.
Leibinsohn, Saul H., to Koninklijke Emballage Industrie Van Leer B. V. Flow regulator. 4,176,683, Cl. 137-559.000.
Leibowitz, Herman M.: *See—*
Eskesen, John H.; and Leibowitz, Herman M., 4,177,011, Cl. 416-191.000.
Leitner, Kajetan. Chuck for gripping head of screw. 4,176,699, Cl. 145-52.000.
LeJeune, Roland A.: *See—*
Barnes, William; Gerstenberg, Roy W.; Kropa, Gomer E.; and LeJeune, Roland A., 4,176,796, Cl. 241-30.000.
Leliaert, Raymond M., to Wheelabrator-Frye Inc. Spacerless blasting wheel and blade locking arrangement therefor. 4,176,502, Cl. 51-434.000.
LeMere, Roger: *See—*
Hughes, Francis H.; Morton, Kenneth O.; LeMere, Roger; and Brown, Fred A., III, 4,176,832, Cl. 271-10.000.
Lemmer, Ludwig: *See—*
Schulz, Ralf-Thilo; Brunsch, Klaus; and Lemmer, Ludwig, 4,177,306, Cl. 428-107.000.
Lendl, Josef, to Triumph Werke Nurnberg A.G. Mosaic printing head. 4,176,976, Cl. 400-124.000.
Lenz, Seymour. Multiple contact electrical test probe assembly. 4,177,425, Cl. 324-158.00P.
Lepicard, Georges: *See—*
Appell, Marc; Lepicard, Georges; de Rivet, Philippe-Hubert; Bradley, John J.; and Franklin, Benjamin S., 4,177,510, Cl. 364-200.000.
Lermann, Peter; and Fauth, Gunter, to AGFA-Gevaert, A.G. Arrangement of a photographic camera. 4,176,934, Cl. 354-150.000.
Le Rolland, Pierre M.: *See—*
Quere, Eugene M.; and Le Rolland, Pierre M., 4,176,446, Cl. 29-622.000.
Letraset USA Inc.: *See—*
Shadbolt, Philip; and Ganszczyk, Helen, 4,177,309, Cl. 428-195.000.
Leuchter, Jurgen, to AGFA-Gevaert, A.G. Developing apparatus with contact-free light trap. 4,176,939, Cl. 354-307.000.
Levandoski, Raymond A.: *See—*
Hudson, James A., Jr.; Levandoski, Raymond A.; and Long, Allen K., 4,177,097, Cl. 156-48.000.
Levin, Don. Method of attaching hair pieces. 4,176,669, Cl. 132-53.000.
Levis, William W., Jr.: *See—*
Austin, Arthur L.; Levis, William W., Jr.; Pizzini, Louis C.; and Hartman, Robert J., 4,177,335, Cl. 521-171.000.
Levstik, Frank T. Fishing lure with retractable and automatically extendable hook. 4,176,489, Cl. 43-35.000.
Levy, Sidney. Solar energy collection system and apparatus for same utilizing latent energy storage fluid. 4,176,655, Cl. 126-436.000.
Lewis, Richard: *See—*
Linton, Francis E.; and Lewis, Richard, 4,176,824, Cl. 254-86.00R.
l'Hoir, Paul A. L., to B. V. Etikettenfabriek Gebroeders Mogendorff. Label or tag. 4,176,479, Cl. 40-2.00R.
Liberman, Richa.d, to Crane Co. Floating seat butterfly valve. 4,176,675, Cl. 137-340.000.
Licentia Patent-Verwaltung-G.m.b.H.: *See—*
Bischoff, Erich; Dangel, Jurgen; Schussler, Hans; Ricker, Thomas; and Stein, Erich, 4,176,442, Cl. 29-571.000.
Klank, Otto, 4,177,428, Cl. 325-455.000.
Licentia Patent-Verwaltungs-G.m.b.H.: *See—*
Hintzmann, Kurt; Kaiser, Reinhold; Link, Wolfgang; Minner, Willy; Mutz, Dieter; Salomon, Manfred; and Wingert, Arnim, 4,177,480, Cl. 357-84.000.
Lichtenberger, William J., to Westinghouse Air Brake Company. Electromagnetic structure for a vital relay. 4,177,441, Cl. 335-270.000.
Lichter, Robert J. Safe, and method and apparatus for building it. 4,176,440, Cl. 29-458.000.
Liepmann, Hans; Hueschens, Rolf; Milkowski, Wolfgang; Zeugner, Horst; Heinemann, Henning; Wolf, Klaus-Ullrich; Hell, Insa; and Hempel, Reinhard, to Kali-Chemie Pharma GmbH. Pharmaceutical compositions of N_1-acyl-N_2-phenyldiaminopropanols and process for their preparation. 4,177,287, Cl. 424-285.000.
Liesveld, Daniel J. Oscillating liquid jet system and method for cutting granite and the like. 4,176,883, Cl. 299-17.000.
Lill, John F., to AMP Incorporated. Electrical connections for windings of motor stators. 4,177,397, Cl. 310-71.000.
Lillis, William J.: *See—*
Henry, Paul M.; and Lillis, William J., 4,177,417, Cl. 323-4.000.
Lindauer Dornier Gesellschaft mbH: *See—*
Rottensteiner, Hans, 4,176,429, Cl. 26-93.000.
Lindberg, Ulf H. A.; Ross, Svante B.; Thorberg, Seth O.; and Ogren, Sven O., to Astra Lakemedel Aktiebolag. Compounds having antidepressive activity. 4,177,291, Cl. 424-330.000.
Linde Aktiengesellschaft: *See—*
Gobl, Horst, 4,176,761, Cl. 220-438.000.
Lingenfelter, Mike L., to Suhey, Louise D. Programmable control for load management. 4,177,388, Cl. 307-38.000.

Link, Wolfgang: *See—*
Hintzmann, Kurt; Kaiser, Reinhold; Link, Wolfgang; Minner, Willy; Mutz, Dieter; Salomon, Manfred; and Wingert, Arnim, 4,177,480, Cl. 357-84.000.

Linstromberg, William J.; and Hartman, Robert F., to Whirlpool Corporation. Ice crusher for refrigerator. 4,176,527, Cl. 62-320.000.

Linton, Francis E.; and Lewis, Richard. Lifting apparatus. 4,176,824, Cl. 254-86.00R.

Lion Yushi Kabushiki Kaisha: *See—*
Sakuma, Kouhei; Ukigai, Toshiyuki; Yamashita, Tatsuji; and Yamaki, Osamu, 4,177,039, Cl. 44-51.000.

Lipschutz, Paul, to Neiman S.A. Locking cap for fuel tank with remote unlocking control. 4,176,867, Cl. 292-201.000.

Ljudkovsky, Vadim M.: *See—*
Krupman, Leonid I.; Yaroslavtsev, Jury G.; Sochnev, Alexandr E.; Shamil, Jury P.; Khitrik, Abram I.; Antipenko, Grigory I.; Smetanin, Jury G.; Samsonov, Albert N.; Ljudkovsky, Vadim M.; Pokrass, Leonid M.; Kurdjukov, Anatoly A.; Ofengenden, Abram M.; and Zhitnik, Georgy G., 4,177,070, Cl. 75-257.000.

Lo-Jack Corporation: *See—*
Reagan, William R., 4,177,466, Cl. 343-112.0TC.

Lobry, Edmond: *See—*
Windal, Bernard A. M.; and Lobry, Edmond, 4,177,326, Cl. 428-645.000.

Logic Devices, Inc.: *See—*
Allen, Paul E., 4,177,238, Cl. 264-328.000.

Lohn, Gerd, to Kaltenbach & Voigt GmbH & Co. Vane air motor with eccentric adjustment ring and bearing ring for vane ends. 4,177,024, Cl. 418-16.000.

Loichinger, Brant A.: *See—*
Mettler, Mark F.; Faust, Clifford C.; Loichinger, Brant A.; and Forrest, Walter T., 4,176,700, Cl. 150-3.000.

Long, Allen K.: *See—*
Hudson, James A., Jr.; Levandoski, Raymond A.; and Long, Allen K., 4,177,097, Cl. 156-48.000.

Long, Everett J.: *See—*
Hines, Clyde K.; Long, Everett J.; and Muench, Elmer W., 4,176,900, Cl. 339-75.0MP.

Lorenz, Jindrich: *See—*
Ruzicka, Jan; Lorenz, Jindrich; Marek, Vladimir; and Tusl, Miroslav, 4,176,978, Cl. 401-96.000.

Loreto, Wilfredo P.: *See—*
Vulich, Yordan; and Loreto, Wilfredo P., 4,176,498, Cl. 51-101.0LG.

Lormeau, Jean-Claude; Choay, Jean; and Goulay, Jean, to Choay S.A. Plasminogen compositions containing preactivated plasminogens with or without native plasminogens, process for making same, pharmaceutical compositions and control of blood clots. 4,177,262, Cl. 424-105.000.

Lowe, Joe A. Portable fishing rod holder. 4,176,819, Cl. 248-513.000.

Lowe, Warren, to Chevron Research Company. Lubricating oil additive composition. 4,177,153, Cl. 252-32.70E.

Lower, Geertruiida J.: *See—*
Akkerboom, Piet J.; Lower, Geertruiida J.; and Timp, Willem J., 4,177,189, Cl. 260-239.100.

Lowry, George W., to Metals & Plastics, Inc. Method and apparatus for cleaning thermoplastic materials. 4,177,234, Cl. 264-140.000.

Lucas Industries, Limited: *See—*
Skinner, Robert T. J., 4,176,640, Cl. 123-139.0AQ.

Lucca, Salvatore: *See—*
Merker, Reuven; and Lucca, Salvatore, 4,177,131, Cl. 204-50.00Y.

Luce, Rudiger: *See—*
Biebricher, Christof; and Luce, Rudiger, 4,177,038, Cl. 8-192.000.

Luciani, Luciano: *See—*
Cecchin, Giuliano; Luciani, Luciano; and Griselli, Pier Luigi, 4,177,160, Cl. 252-429.00B.

Lucke Apparatebau GmbH: *See—*
Lucke, Florian, 4,176,802, Cl. 242-2.000.

Lucke, Florian, to Lucke Apparatebau GmbH. Apparatus for laying balls of stranded material into cups of a conveyor. 4,176,802, Cl. 242-2.000.

Luginbuhl, Pierre, to S I G Schweizerische Industrie-Gesellschaft. Apparatus for forming stacks of flat objects. 4,176,993, Cl. 414-106.000.

Lundvall, Donald O., I; Engels, John P.; and Yesconis, Robert R., to United States of America, Air Force. Near-range personnel beacon locator apparatus. 4,177,465, Cl. 343-112.00D.

Lynch, Richard W.: *See—*
Dotson, Ronald L.; and Lynch, Richard W., 4,177,115, Cl. 204-78.000.

Lyons, Bernard J.: *See—*
Horsma, David A.; Lyons, Bernard J.; and Smith-Johannsen, Robert, 4,177,376, Cl. 219-553.000.

M&T Chemicals Inc.: *See—*
Mansukhani, Ishwar R., 4,177,075, Cl. 106-30.000.

MacDonald, Malcolm D. Swimming pool cleaning device. 4,176,419, Cl. 15-1.700.

Mackal, Glenn H. Oral inflation valve. 4,176,681, Cl. 137-516.290.

MacKiernan, Stuart W., Jr. Blank check system. 4,176,861, Cl. 283-58.000.

Madsen, Peter E.: *See—*
Lee, James A.; Madsen, Peter E.; and Hills, Ronald F., 4,177,087, Cl. 148-11.50R.

Maeda, Yoshio; Matsumoto, Koichi; Fukuda, Kenji; and Shindo, Isao, to Hitachi, Ltd. Method and apparatus for optically analyzing specimen by using two light beams. 4,176,957, Cl. 356-319.000.

Mageli, Orville L.; and Swarts, William A., to Pennwalt Corporation. Peroxy compounds. 4,177,204, Cl. 260-453.0RZ.

Mages, Bernhard: *See—*
Rock, Erich; and Mages, Bernhard, 4,176,422, Cl. 16-130.000.
Rock, Erich; and Mages, Bernhard, 4,176,424, Cl. 16-148.000.
Rock, Erich; and Mages, Bernhard, 4,176,496, Cl. 49-410.000.

Magid, David J., to Cello Chemical Company. Surface treating pad. 4,176,420, Cl. 15-230.000.

Malone, Paul E., to General Electric Company. Method and apparatus for controlled-temperature valve mode transfers in a steam turbine. 4,177,387, Cl. 290-40.00R.

Manara, Giovanni; Notari, Bruno; and Fattore, Vittorio, to Snamprogetti S.p.A. Catalyst for the preparation of dimethyl ether. 4,177,167, Cl. 252-455.00R.

Mancini, Derek V., to Consumers Glass Company Limited. Condiment packaging machine. 4,176,507, Cl. 53-478.000.

Manis, John R. Firearm barrels and projectiles. 4,176,487, Cl. 42-76.00R.

Mannesmann Aktiengesellschaft: *See—*
Holter, Karl; and Wiegard, Gustav, 4,176,462, Cl. 33-182.000.

Mansukhani, Ishwar R., to M&T Chemicals Inc. Jet printing ink containing ammonium formate electrolyte. 4,177,075, Cl. 106-30.000.

Marcatili, Enrique A. J.; and Marcuse, Dietrich, to Bell Telephone Laboratories, Incorporated. Graded index optical fiber. 4,176,911, Cl. 350-96.310.

Marchaix, Raymond; and Le Cun, Alain, to Regie Nationale des Usines Renault. Safety device for venting a fuel tank. 4,176,678, Cl. 137-493.000.

Marchello, John L. Bicycle seat. 4,176,880, Cl. 297-452.000.

Marchenko, Alexandr M.: *See—*
Paton, Boris E.; Medovar, Boris I.; Tsukanov, Georgy E.; Bogachenko, Alexei G.; Artamonov, Viktor L.; Timashov, Grigory A.; Shtanko, Jury P.; Marchenko, Alexandr M.; Fedorovsky, Boris B.; Kumysh, Ilya I.; Chepurnoi, Anatoly D.; Saenko, Vladimir Y.; and Semin-Vadov, Gennady M., 4,177,058, Cl. 75-10.00C.

Marcuse, Dietrich: *See—*
Marcatili, Enrique A. J.; and Marcuse, Dietrich, 4,176,911, Cl. 350-96.310.

Marechal, Gilles, to Societe d'Exploitation des Procedes Marechal SEPM. Flexible electrical contact. 4,176,905, Cl. 339-255.00R.

Marechal, Gilles A. G., to Societe d'Exploitation des Procedes Marechal SEPM. Electric plug and socket connectors with resilient end-pressure contacts and safety disc. 4,176,898, Cl. 339-41.000.

Marechal, Robert A.: *See—*
Bertrand, Jacques A.; and Marechal, Robert A., 4,176,810, Cl. 242-107.40B.

Marek, Vladimir: *See—*
Ruzicka, Jan; Lorenz, Jindrich; Marek, Vladimir; and Tusl, Miroslav, 4,176,978, Cl. 401-96.000.

Markham, Michael H.; and Ruston, Rudolf S., to Chubb Industries Limited. Safe deposit apparatus. 4,176,610, Cl. 109-59.00R.

Marsai, Maria: *See—*
Tuba, Zoltan; Marsai, Maria; Biro, Katalin; Szporny, Laszlo; Karpati, Egon; and Szeberenyi, Szabolcs, 4,177,190, Cl. 260-239.500.

Marshall Air Systems, Inc.: *See—*
Stuck, Robert M., 4,176,589, Cl. 99-386.000.

Martin, Barrie J., to Plessey Handel und Investments AG. Fuel injection system. 4,176,634, Cl. 123-119.0EE.

Marty, William B., Jr. Cockpit display simulator for electronic countermeasure training. 4,176,468, Cl. 35-10.400.

Maruzen Petrochemical Co., Ltd.: *See—*
Hayashi, Kiyoshige; Nakaniwa, Mikio; Kobayashi, Nobuyuki; Yamamoto, Minoru; and Hase, Yoshihiko, 4,177,133, Cl. 208-50.000.

Marvin Glass & Assoc.: *See—*
Terzian, Rouben T., 4,176,593, Cl. 99-422.000.

Maryland Cup Corporation: *See—*
West, John B., 4,176,766, Cl. 222-238.000.

Masak, Raymond J., to United States of America, Air Force. Multiplexing of multiple loop sidelobe cancellers. 4,177,464, Cl. 343-100.0LE.

Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft (M.A.N.): *See—*
Bozung, Hans-Gunther; and Mendle, Hans, 4,177,005, Cl. 415-128.000.

Maschinenfabrik WIFAG: *See—*
Heimlicher, Paul, 4,176,833, Cl. 270-71.000.

Masoero, Renzo: *See—*
Cattaneo, Maurizio; and Masoero, Renzo, 4,176,791, Cl. 239-76.000.

Mason, John W. Tone dial toll restrictor. 4,177,358, Cl. 179-18.0DA.

Mason, Ralph I., to Shaw GMC Trucks Ltd. Electronic digital governor. 4,177,516, Cl. 364-431.000.

Mason, Robert D. Combined switch and flasher. 4,177,408, Cl. 315-362.000.

Massey-Ferguson Services N.V.: *See—*
Collin, John, 4,176,852, Cl. 280-415.00A.

Mastuzaki, Harumi; Ebara, Katsuya; and Takahashi, Sankichi, to Hitachi Plant Engineering & Construction Co., Ltd.; and Hitachi, Ltd. Dialysis method and apparatus therefor. 4,177,138, Cl. 210-22.00C.

Mather & Platt Limited: *See—*
Bray, Geddes A., 4,176,719, Cl. 169-39.000.

Mathews, John P.; and Smith, Michael J., to P. R. Mallory & Co. Inc. Metal-air battery having electrically operated air access vent cover. 4,177,327, Cl. 429-27.000.

Mathews, Max V., to Bell Telephone Laboratories, Incorporated. Graphic communications apparatus. 4,177,354, Cl. 178-18.000.

Matsu Kyu Kabushiki Kaisha: *See*—
Fukuda, Hiroshi; and Matsuzaka, Haruo, 4,176,782, Cl. 235-449.000.
Matsumoto, Kazuya; Kawamura, Naoto; and Minami, Setsuo, to Canon Kabushiki Kaisha. Scanning device. 4,176,907, Cl. 350-6.800.
Matsumoto, Koichi: *See*—
Maeda, Yoshio; Matsumoto, Koichi; Fukuda, Kenji; and Shindo, Isao, 4,176,957, Cl. 356-319.000.
Matsushita Electric Industrial Co., Ltd.: *See*—
Kamiyama, Toshibumi; and Miyamoto, Kunito, 4,176,524, Cl. 62-140.000.
Katakabe, Noboru; Yamaguchi, Isao; and Onishi, Masaru, 4,176,940, Cl. 355-10.000.
Kawakami, Hakuhei; Ishihara, Takeshi; and Hatada, Kenzo, 4,176,518, Cl. 58-38.00R.
Minakuchi, Hiroshi, 4,177,412, Cl. 318-341.000.
Sakai, Koichi, 4,177,488, Cl. 360-72.300.
Matsushita Electronics Corporation: *See*—
Okumura, Tomisaburo; Okazaki, Hiroshi; and Tsuchitani, Akira, 4,177,096, Cl. 148-187.000.
Matsuzaka, Haruo: *See*—
Fukuda, Hiroshi; and Matsuzaka, Haruo, 4,176,782, Cl. 235-449.000.
Matthias, Heinz-Bernd: *See*—
Florjancic, Dusan; and Matthias, Heinz-Bernd, 4,177,008, Cl. 415-206.000.
Matthias, Jan H., to Carrera International Corporation. Sport goggle. 4,176,410, Cl. 2-436.000.
Matthias, Jan H., to Carrera International Corporation. Eyeglasses having removable lenses. 4,176,921, Cl. 351-106.000.
Mattis, Donald J.: *See*—
Horwitt, Laurence G.; and Mattis, Donald J., 4,177,374, Cl. 219-265.000.
Max-Planck-Gesellschaft zur Forderung der Wissenschafen e.V.: *See*—
Biebricher, Christof; and Luce, Rudiger, 4,177,038, Cl. 8-192.000.
Mayer, Gerald M., to United States of America, Navy. Spatially distributed analog time division multiplexer. 4,177,357, Cl. 179-15.00A.
Mayer, James W.: *See*—
Lau, Silvanus S.; Mayer, James W.; and Sigmon, Thomas W., 4,177,084, Cl. 148-1.500.
Mayer, Sigmund: *See*—
Rebsdat, Siegfried; Mayer, Sigmund; Alfranseder, Josef; and Riedl, Josef, 4,177,169, Cl. 252-476.000.
Mayevsky, Abraham: *See*—
Bartoov, Benjamin; Mayevsky, Abraham; Mendel, Shmuel; and Oren, Amiram, 4,176,953, Cl. 356-73.000.
Mazdiyasni, Khodabakhsh S., to United States of America, Air Force. Process for producing reaction sintered silicon nitride of increased density. 4,177,230, Cl. 264-60.000.
Mazoff, Joseph. Drill sharpener. 4,176,499, Cl. 51-124.00R.
McCabe, Ralph P., to Colt Industries Operation Corp. Governor apparatus and system. 4,176,633, Cl. 123-102.000.
McCandless, Harry E., to RCA Corporation. Method for establishing uniform cathode-to-grid spacing in an electron gun. 4,176,432, Cl. 29-25.160.
McCardle, Arthur, Jr., to General Electric Company. Variable area exhaust nozzle. 4,176,792, Cl. 239-265.410.
McCart, Larry D.: *See*—
Weinert, Harry F.; McCart, Larry D.; and Weisgerber, David J., 4,177,000, Cl. 414-620.000.
McClatchie, Edward A.; Watson, Dean A.; and Burough, Irvin G., to Andros Incorporated. Gas analyzer sample cell. 4,177,381, Cl. 250-343.000.
McClead, Jerry W.: *See*—
Schlangen, Andrew J.; McClead, Jerry W.; and Garavalia, Thomas A., 4,177,007, Cl. 415-160.000.
McCloskey, John H.: *See*—
Bishai, Wilson B.; and McCloskey, John H., 4,176,974, Cl. 400-111.000.
McClure, Charles L., to Pro-Tech, Inc. Depth/flow monitoring instrumentation. 4,176,550, Cl. 73-302.000.
McClure, John W.; and Hudson, George S., to Avco Corporation. Torque correlation ring. 4,176,547, Cl. 73-136.00R.
McCombs, Russell L.; and Motsinger, James V., to Baker International Corporation. Method and apparatus for counting turns when making threaded joints. 4,176,436, Cl. 29-240.000.
McCook, Thomas J.; and Shragal, John F., to Stewart-Warner Corporation. Instrument cluster assembly. 4,177,497, Cl. 361-331.000.
McCormack, Ray G., to United States of America, Army. RFI shielded doors with inflatable gaskets. 4,177,353, Cl. 174-35.0GC.
McCullough, John W.: *See*—
Hoffman, Roy L.; Kempke, William G.; McCullough, John W.; Soltis, Frank G.; and Turner, Richard T., 4,177,513, Cl. 364-200.000.
McCurdy, J. L.: *See*—
Wallace, Robert A.; and McCurdy, J. L., 4,176,969, Cl. 366-149.000.
McDaniel, Max P.; and Welch, Melvin B., to Phillips Petroleum Company. Sulfiding and reoxidation of chromium catalyst. 4,177,162, Cl. 252-439.000.
McDonnell Douglas Corporation: *See*—
Goldsworthy, William B.; and Karlson, Harald E., 4,177,029, Cl. 425-112.000.
McGill, Charles K., to Reilly Tar & Chemical Corporation. Substituted 2,2′-bipyridyl compounds and process for preparing same. 4,177,349, Cl. 546-255.000.
McGraw-Edison Company: *See*—
Urani, Angelo, 4,176,906, Cl. 339-258.00F.
McGunigle, Richard D.: *See*—
Hatter, Edward E.; Taylor, Richard H.; and McGunigle, Richard D., 4,176,454, Cl. 433-119.000.
McLaughlin, James F.; and Goldie, Harry, to United States of America, Air Force. High power pre-TR switch. 4,177,437, Cl. 333-13.000.
McMorrow, John J. Blood segment processor. 4,176,451, Cl. 30-124.000.
McNary, James F.: *See*—
Wetmore, Sherman B.; McNary, James F.; and Person, Abraham, 4,176,722, Cl. 175-7.000.
Mechanical Technology Incorporated: *See*—
Dorman, Richard A., 4,176,555, Cl. 73-658.000.
Meck & Co., Inc.: *See*—
Bochis, Richard J.; and Kulsa, Peter, 4,177,274, Cl. 424-256.000.
Medovar, Boris I.: *See*—
Paton, Boris E.; Medovar, Boris I.; Tsukanov, Georgy E.; Bogachenko, Alexei G.; Artamonov, Viktor L.; Timashov, Grigory A.; Shtanko, Jury P.; Marchenko, Alexandr M.; Fedorovsky, Boris B.; Kumysh, Ilya I.; Chepurnoi, Anatoly D.; Saenko, Vladimir Y.; and Semin-Vadov, Gennady M., 4,177,058, Cl. 75-10.00C.
Meiji Seika Co., Ltd.: *See*—
Mochizuki, Keizo; and Hachiya, Iwao, 4,177,296, Cl. 426-632.000.
Meixner, Hans, to Siemens Aktiengesellschaft. Heating device having an optimized heating element of PTC thermistor material. 4,177,375, Cl. 219-441.000.
Mendel, Shmuel: *See*—
Bartoov, Benjamin; Mayevsky, Abraham; Mendel, Shmuel; and Oren, Amiram, 4,176,953, Cl. 356-73.000.
Mendenhall, Robert L. Method and apparatus for recycling asphalt-aggregate compositions. 4,177,080, Cl. 106-281.00R.
Mendle, Hans: *See*—
Bozung, Hans-Gunther; and Mendle, Hans, 4,177,005, Cl. 415-128.000.
Mercer, James B. Therapeutic treatment for measles viral infection. 4,177,281, Cl. 424-273.00R.
Merck & Co., Inc.: *See*—
Cragoe, Edward J., Jr.; and Woltersdorf, Otto W., Jr., 4,177,285, Cl. 424-275.000.
Merker, Reuven; and Lucca, Salvatore, to Metalux Corporation, The. Method for obtaining bright zinc and cadmium electroplates using carboxamide additives. 4,177,131, Cl. 204-50.00Y.
Merlette, Didier, to Techniques Europeennes de Commutation (T.E.C.). Moving-armature electromagnetic device. 4,177,440, Cl. 335-247.000.
Messer Griesheim GmbH: *See*—
Lange, Gerhardt, 4,176,828, Cl. 266-65.000.
Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung: *See*—
Schulz, Ralf-Thilo; Brunsch, Klaus; and Lemmer, Ludwig, 4,177,306, Cl. 428-107.000.
Metals & Plastics, Inc.: *See*—
Lowry, George W., 4,177,234, Cl. 264-140.000.
Metalux Corporation, The: *See*—
Merker, Reuven; and Lucca, Salvatore, 4,177,131, Cl. 204-50.00Y.
Mette, Klaus H.; and St. Denis, Andrew R. Monitoring device for power presses. 4,177,517, Cl. 364-559.000.
Mettler, Mark F.; Faust, Clifford C.; Loichinger, Brant A.; and Forrest, Walter T., to Union Carbide Corporation. Flexible tubular casing article. 4,176,700, Cl. 150-3.000.
Meyer, Hans R., to Ciba-Geigy Corporation. Distilbenyl-oxdiazoles. 4,177,347, Cl. 542-459.000.
Meyer, Heinrich F.: *See*—
Zahn, Irwin; and Meyer, Heinrich F., 4,176,448, Cl. 29-626.000.
Meyerhoff, Leonard: *See*—
Rickards, Michael A.; Ruhe, Richard K.; Meyerhoff, Leonard; and Hook, James M., 4,176,613, Cl. 114-67.00A.
Michael, Dietrich: *See*—
Tacke, Peter; Neuray, Dieter; and Michael, Dietrich, 4,177,185, Cl. 260-38.000.
Michaelis, Eduard, to Vereinigte Osterreichische Eisen- und Stahlwerke - Alpine Montan Aktiengesellschaft. Method of continuously casting a steel strand. 4,176,707, Cl. 164-89.000.
Michaels, Alan S.; and Guillod, Mark S., to ALZA Corporation. Osmotic bursting drug delivery device. 4,177,256, Cl. 424-22.000.
Michel, Gerd W.; and Fralick, Elizabeth A., to E. R. Squibb & Sons, Inc. Process for the purification of amphotericin B and A solubilizing media useful in that process. 4,177,265, Cl. 424-181.000.
Michel, Rolf: *See*—
Elsner, Wolfgang; Kalter, Werner; Michel, Rolf; and Moslener, Jorn, 4,176,535, Cl. 72-10.000.
Microdot Inc.: *See*—
Witte, Erwin C., 4,176,582, Cl. 85-61.000.
Middle East Software Corporation: *See*—
Bishai, Wilson B.; and McCloskey, John H., 4,176,974, Cl. 400-111.000.
Midway Mfg. Co.: *See*—
Ryan, Allen L.; Jansons, Eric G.; Halliburton, Ronald D.; and Pearson, James H., 4,176,844, Cl. 273-121.00A.
Milkowski, Wolfgang: *See*—
Liepmann, Hans; Hueschens, Rolf; Milkowski, Wolfgang; Zeugner, Horst; Heinemann, Henning; Wolf, Klaus-Ullrich; Hell, Insa; and Hempel, Reinhard, 4,177,287, Cl. 424-285.000.

Miller, Diane. Pneumatic biasing device for preventing air from entering a nursing bottle. 4,176,754, Cl. 215-11.00E.

Miller, John S.: *See—*
Dey, Arabinda N.; Miller, John S.; and Bowden, William L., 4,177,329, Cl. 429-101.000.

Mills, Robert L.: *See—*
Stoner, Jesse A.; and Mills, Robert L., 4,176,693, Cl. 141-1.000.

Minakuchi, Hiroshi, to Matsushita Electric Industrial Co., Ltd. Closed loop rotational speed control system having means for generating a PNM signal for an electric motor. 4,177,412, Cl. 318-341.000.

Minami, Setsuo: *See—*
Matsumoto, Kazuya; Kawamura, Naoto; and Minami, Setsuo, 4,176,907, Cl. 350-6.800.

Minner, Willy: *See—*
Hintzmann, Kurt; Kaiser, Reinhold; Link, Wolfgang; Minner, Willy; Mutz, Dieter; Salomon, Manfred; and Wingert, Arnim, 4,177,480, Cl. 357-84.000.

Minnesota Mining & Manufacturing Company: *See—*
Welna, Walton W.; and Frank, Lowell C., 4,177,078, Cl. 106-67.000.

Minolta Camera Kabushiki Kaisha: *See—*
Imura, Toshinori, 4,176,930, Cl. 354-59.000.
Yamada, Seiji; Yoshiyama, Ichiro; and Kitaura, Mashio, 4,176,955, Cl. 356-222.000.

Minoo, Osamu: *See—*
Ichikawa, Toshiji; and Minoo, Osamu, 4,177,182, Cl. 260-29.1SB.

Minyard, Larry J.: *See—*
Campbell, Joseph M.; and Minyard, Larry J., 4,176,578, Cl. 84-115.000.

Mishima, Takao; Semba, Shoji; Ogata, Kiichi; and Funahashi, Osamu, to Kanebo, Ltd.; and Wakayama Iron Works, Ltd. Apparatus for continuously washing fabric with water. 4,176,532, Cl. 68-19.000.

Misono, Izumi: *See—*
Yoshida, Akihiko; Koaki, Akira; Nakano, Takahumi; Miyake, Mitsunao; Kanai, Teijiro; and Misono, Izumi, 4,176,605, Cl. 101-451.000.

Missimer, Dale J., to Polycold Systems, Inc. Refrigeration system having quick defrost and re-cool. 4,176,526, Cl. 62-278.000.

Mission Marketing Corporation of Arizona: *See—*
Cox, Howard W., 4,176,587, Cl. 98-116.000.

Mitchell, Charles S., to Silonics, Inc. Carriage and raceway mechanism for an ink jet printer. 4,177,471, Cl. 346-140.00R.

Mitchell, John: *See—*
Smith, John B.; Bell, Peter W.; Queen, David S.; and Mitchell, John, 4,177,311, Cl. 428-246.000.

Mitchell, Richard E.: *See—*
Janoski, Edward J.; Mitchell, Richard E.; and Schneider, Abraham, 4,177,217, Cl. 585-253.000.

Mitchell, William O.: *See—*
Patterson, Thomas K.; Mitchell, William O.; Smith, Donald H.; and Hunter, John P., Jr., 4,176,566, Cl. 83-29.000.

Mitschke, Karl-Heinz; Niederprum, Hans; and Kapps, Manfred, to Bayer Aktiengesellschaft. 1,1,1-Trifluoro-2-chloroethane as blowing agent for polyurethane foam. 4,177,332, Cl. 521-98.000.

Mitsubishi Denki Kabushiki Kaisha: *See—*
Hokuyo, Shigeru; and Gamo, Hiroshi, 4,177,477, Cl. 357-38.000.

Mitsubishi Gas Chemical Company, Inc.: *See—*
Yonemitsu, Eiichi; Miyamori, Hiroshi; Nawata, Takanari; Fujioka, Tomio; Ito, Akira; and Kobayashi, Makoto, 4,177,247, Cl. 423-515.000.

Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
Yoshida, Akihiko; Koaki, Akira; Nakano, Takahumi; Miyake, Mitsunao; Kanai, Teijiro; and Misono, Izumi, 4,176,605, Cl. 101-451.000.

Mitsubishi Plastics Industries Limited: *See—*
Ueno, Yoshio; Ikeda, Takeshi; and Isozaki, Masaru, 4,177,237, Cl. 264-296.000.

Mituishi, Hisao: *See—*
Kobayashi, Mituki; Awao, Takao; Mizusaki, Yujiro; Sato, Kunio; Kato, Akio; and Mituishi, Hisao, 4,177,069, Cl. 75-213.000.

Miyake, Mitsunao: *See—*
Yoshida, Akihiko; Koaki, Akira; Nakano, Takahumi; Miyake, Mitsunao; Kanai, Teijiro; and Misono, Izumi, 4,176,605, Cl. 101-451.000.

Miyamori, Hiroshi: *See—*
Yonemitsu, Eiichi; Miyamori, Hiroshi; Nawata, Takanari; Fujioka, Tomio; Ito, Akira; and Kobayashi, Makoto, 4,177,247, Cl. 423-515.000.

Miyamoto, Kunito: *See—*
Kamiyama, Toshibumi; and Miyamoto, Kunito, 4,176,524, Cl. 62-140.000.

Miyamoto, Nobuo: *See—*
Shigeta, Junji; Oi, Tetsu; Kotera, Nobuo; Nakashima, Muneyasu; and Miyamoto, Nobuo, 4,177,298, Cl. 427-85.000.

Miyao, Shigeru: *See—*
Kamiya, Tamotsu; and Miyao, Shigeru, 4,177,023, Cl. 417-540.000.

Mizobuchi, Yuzo: *See—*
Ono, Yoshihiro; Harada, Shigeo; Mizobuchi, Yuzo; and Ikeda, Tomoaki, 4,177,072, Cl. 430-302.000.

Mizuno, Toshio: *See—*
Yoshimura, Tatsushiro; Namba, Mutsusuke; Suzue, Seisuke; Tominaga, Shigetake; Mizuno, Toshio; and Hayashida, Nariyoshi, 4,177,320, Cl. 428-419.000.

Mizusaki, Yujiro: *See—*
Kobayashi, Mituki; Awao, Takao; Mizusaki, Yujiro; Sato, Kunio; Kato, Akio; and Mituishi, Hisao, 4,177,069, Cl. 75-213.000.

Mlekarensky prumysl, generalni reditelstvi: *See—*
Forman, Ladislav; Pech, Zdenek; and Vondruska, Vaclav, 4,177,293, Cl. 426-43.000.

Mobil Oil Corporation: *See—*
Chang, Clarence D.; and Lang, William H., 4,177,202, Cl. 260-449.00R.
Espenscheid, Wilton F., 4,177,079, Cl. 106-274.000.
Heiba, El-Ahmadi I.; Kinney, Robert E.; and Stead, George E., 4,177,192, Cl. 260-326.220.
Oleck, Stephen M.; and Sherry, Howard S., 4,177,163, Cl. 252-439.000.

Mochizuki, Keizo; and Hachiya, Iwao, to Meiji Seika Co., Ltd. Process for the preparation of peanut-curd. 4,177,296, Cl. 426-632.000.

Moczulski, Zdzislaw: *See—*
Bielecki, Marek; Bogdanski, Andrzej; Buxakowski, Andrzej; Chudzinski, Janusz; Glogowski, Andrzej; Kopczynski, Marian; Krolikowski, Andrzej; Kryszewski, Jozef; Moczulski, Zdzislaw; Ochocki, Wlodzimierz; Pomorski, Aleksander; Rumatowski, Karol; Sawicki, Janusz; Szostakowski, Henryk; Warowny, Tadeusz; Wisniewski, Teofil; and Wozniak, Antoni, 4,176,624, Cl. 123-32.0EA.

Moggia, Richard A., to Burroughs Corporation. Soft input/output auto poll system. 4,177,512, Cl. 364-200.000.

Montedison S.p.A.: *See—*
Cecchin, Giuliano; Luciani, Luciano; and Griselli, Pier Luigi, 4,177,160, Cl. 252-429.00B.
Dal Bianco, Alberto, 4,177,240, Cl. 422-115.000.

Montren, William T.: *See—*
Goldstein, Harold; and Montren, William T., 4,177,407, Cl. 315-312.000.

Montz, James R.: *See—*
Allard, John J.; and Montz, James R., 4,176,785, Cl. 236-46.00R.

Moore, Mary A., to Bean, James Richard. Pain relief composition and method of preparing same. 4,177,266, Cl. 424-195.000.

Moore, Wayne O. Method for production of precast manhole bases. 4,177,229, Cl. 264-40.500.

Moretto, Hans-Heinrich: *See—*
de Montigny, Armand; and Moretto, Hans-Heinrich, 4,177,201, Cl. 260-448.20E.

Mori, Haruo, to Fuji Jukogyo Kabushiki Kaisha. Internal combustion engine having exhaust emission control system. 4,176,636, Cl. 123-119.00A.

Mori, Ikuo, to Nippon Kogaku K.K. Wide angle lens. 4,176,915, Cl. 350-220.000.

Moriyama, Toshio. AC type dust collecting apparatus. 4,177,046, Cl. 55-123.000.

Morlet, Jean G.: *See—*
Honnorat, Yves C.; Raisson, Gerard D.; and Morlet, Jean G., 4,177,026, Cl. 425-7.000.

Morton, Kenneth O.: *See—*
Hughes, Francis H.; Morton, Kenneth O.; LeMere, Roger; and Brown, Fred A., III, 4,176,832, Cl. 271-10.000.

Moskovsky Automobilny Zavod imeni I.A. Likhacheva (Proizvodstvennoe Obiedinenie Zil): *See—*
Katkov, Jury V., 4,176,738, Cl. 192-111.00R.

Moslener, Jorn: *See—*
Elsner, Wolfgang; Kalter, Werner; Michel, Rolf; and Moslener, Jorn, 4,176,535, Cl. 72-10.000.

Mosser Industries, Inc.: *See—*
Connor, Peter J., 4,176,673, Cl. 137-240.000.

Motoda Denshi Kogyo Kabushiki Kaisha: *See—*
Motoda, Kenro; and Hasegawa, Kensuke, 4,177,002, Cl. 414-751.000.

Motoda, Kenro; and Hasegawa, Kensuke, to Motoda Denshi Kogyo Kabushiki Kaisha. Cooperative drive robot. 4,177,002, Cl. 414-751.000.

Motorola, Inc.: *See—*
Davis, William F., 4,177,416, Cl. 323-4.000.
Henry, Paul M.; and Lillis, William J., 4,177,417, Cl. 323-4.000.

Motsinger, James V.: *See—*
McCombs, Russell L.; and Motsinger, James V., 4,176,436, Cl. 29-240.000.

Msika, Nessim C.: *See—*
Robert, Andre J.; Bourdon, Claude G.; Msika, Nessim C.; Chorlay, Etienne G.; and Euzenade, Jean-Louis, 4,176,951, Cl. 356-33.000.

Muccigrosso, Vincent J.; Nivison, John L.; and Oberg, Albert E., to Westinghouse Electric Corp. High contrast cathode ray display tube. 4,177,399, Cl. 313-368.000.

Mueller, Karl F.; and Good, William R., to Ciba-Geigy Corporation. Water-insoluble hydrophilic copolymers used as carriers for medicaments and pesticides. 4,177,056, Cl. 71-93.000.

Muench, Elmer W.: *See—*
Hines, Clyde K.; Long, Everett J.; and Muench, Elmer W., 4,176,900, Cl. 339-75.0MP.

Muhlethaler, Henri, to Henri Muhlethaler S.A. Match carrier including frangible protrusions. 4,176,742, Cl. 206-98.000.

Muller, Helmut: *See—*
Rody, Jean; Greber, Gerd; and Muller, Helmut, 4,177,186, Cl. 260-45.80N.

Munch, Walter, to D. H. Baldwin & Company. Improved touch operated capacitance switch circuit for an electronic organ. 4,176,575, Cl. 84-1.010.

Murakami, Keiji, to Kabushiki Kaisha Kawai Gakki Seisakusho. Electronic musical instrument. 4,176,576, Cl. 84-1.010.

Muromoto Iron Works Co., Ltd.: *See—*
Muromoto, Wasaburo, deceased, 4,176,450, Cl. 30-92.000.

Muromoto, Osamu, executor: *See—*
Muromoto, Wasaburo, deceased, 4,176,450, Cl. 30-92.000.
Muromoto, Wasaburo, deceased (by Muromoto, Osamu, executor), to Muromoto Iron Works Co., Ltd. Cutter mainly for cutting synthetic resin articles. 4,176,450, Cl. 30-92.000.
Murray, Dudley C.: *See—*
King, Colin M.; Goddard, Michael R.; and Murray, Dudley C., 4,176,606, Cl. 102-37.400.
Murray, Robert G.; and Gikis, Benjamin J., to Natomas Company. Heat saving method for drying wet solids. 4,176,465, Cl. 34-31.000.
Murtha, Timothy P.; Jones, William A.; and Zuech, Ernest A., to Phillips Petroleum Company. Hydroalkylation composition and process for producing said composition. 4,177,164, Cl. 252-455.00Z.
Murtha, Timothy P.; and Zuech, Ernest A., to Phillips Petroleum Company. Hydroalkylation composition and process for producing said composition. 4,177,165, Cl. 252-455.00Z.
Murtha, Timothy P.; and Zuech, Ernest A., to Phillips Petroleum Company. Hydroalkylation composition and process for producing said composition. 4,177,166, Cl. 252-455.00Z.
Muschi, Johann: *See—*
Gansauge, Jost; Muschi, Johann; and Freudlsperger, Hans, 4,176,710, Cl. 165-104.00F.
Mushkin, Nicholas M. Speaker cabinet. 4,176,730, Cl. 181-148.000.
Mutz, Dieter: *See—*
Hintzmann, Kurt; Kaiser, Reinhold; Link, Wolfgang; Minner, Willy; Mutz, Dieter; Salomon, Manfred; and Wingert, Arnim, 4,177,480, Cl. 357-84.000.
Myer, Charles G.: *See—*
Holtzapple, Mark T.; Wehe, Robert L.; Myer, Charles G.; and Carson, William W., 4,176,522, Cl. 60-459.000.
Myers, Richard E., to Nalco Chemical Company. Elimination of strainer fouling in recirculating cooling water systems. 4,177,143, Cl. 210-82.000.
Mylrea, Kenneth C.; and Demer, Joseph, to University Patents, Inc. Disposable esophageal and tracheal multi-probes. 4,176,660, Cl. 128-671.000.
Nagai, Takanori: *See—*
Shinoda, Osamu; Okabayashi, Keiichi; and Nagai, Takanori, 4,176,639, Cl. 123-136.000.
Naganuma, Kazuo: *See—*
Kishi, Kazuo; Hayashi, Minoru; and Naganuma, Kazuo, 4,176,607, Cl. 102-49.300.
Nagi, Minoru: *See—*
Uemura, Seiichi; Yamamoto, Syunichi; Hirose, Takao; Takashima, Hiroaki; Kato, Osamu; and Nagi, Minoru, 4,177,132, Cl. 208-22.000.
Nagy, Ernest J., to Pullman Incorporated. Sliding door and threshold arrangement for a railway passenger car compartment. 4,176,497, Cl. 49-411.000.
Nakahata, Masaaki: *See—*
Tohyama, Takanori; and Nakahata, Masaaki, 4,177,109, Cl. 435-24.000.
Nakamura, Akio; and Isizuka, Hirosi. Filter medium, process for preparation thereof, filtering method and filtering apparatus. 4,177,141, Cl. 210-70.000.
Nakamura, Kazuo; and Jyojiki, Masao, to Asahi Kogaku Kogyo Kabushiki Kaisha. Focus detecting device. 4,176,928, Cl. 354-25.000.
Nakamura, Norihiko; Toyama, Noboru; and Baika, Toyokazu, to Toyota Jidosha Kabushiki Kogyo Kaisha. Exhaust gas recirculation system for an internal combustion engine. 4,176,635, Cl. 123-119.00A.
Nakamura, Norihiko; Kato, Takashi; and Kobayashi, Tatsuo, to Toyota Jidosha Kogyo Kabushiki Kaisha. Method of igniting in an internal combustion engine. 4,176,646, Cl. 123-148.00E.
Nakamura, Soichi; and Hayashi, Kiyoshi, to Nippon Kogaku K.K. Telephoto lens with large relative aperture. 4,176,913, Cl. 350-214.000.
Nakamura, Takao: *See—*
Torii, Yukio; and Nakamura, Takao, 4,177,307, Cl. 428-116.000.
Nakamura, Yasuo: *See—*
Suzuki, Masatosi; Soda, Kazuya; and Nakamura, Yasuo, 4,177,112, Cl. 204-1.00T.
Nakaniwa, Mikio: *See—*
Hayashi, Kiyoshige; Nakaniwa, Mikio; Kobayashi, Nobuyuki; Yamamoto, Minoru; and Hase, Yoshihiko, 4,177,133, Cl. 208-50.000.
Nakano, Takahumi: *See—*
Yoshida, Akihiko; Koaki, Akira; Nakano, Takahumi; Miyake, Mitsunao; Kanai, Teijiro; and Misono, Izumi, 4,176,605, Cl. 101-451.000.
Nakashima, Muneyasu: *See—*
Shigeta, Junji; Oi, Tetsu; Kotera, Nobuo; Nakashima, Muneyasu; and Miyamoto, Nobuo, 4,177,298, Cl. 427-85.000.
Nalco Chemical Company: *See—*
Albanese, Vincent M., 4,177,043, Cl. 55-5.000.
Myers, Richard E., 4,177,143, Cl. 210-82.000.
Namba, Mutsusuke: *See—*
Yoshimura, Tatsushiro; Namba, Mutsusuke; Suzue, Seisuke; Tominaga, Shigetake; Mizuno, Toshio; and Hayashida, Nariyoshi, 4,177,320, Cl. 428-419.000.
Nancarrow, James H., to Garrett Corporation, The. Turbocharger control. 4,177,006, Cl. 415-151.000.
Naranjo, George, to Illinois Tool Works Inc. Post wire guide latching means. 4,177,359, Cl. 179-98.000.
National Gypsum Company: *See—*
Stiling, Rodney A., 4,176,972, Cl. 366-304.000.
National Laboratory for High Energy Physics: *See—*
Ishimaru, Hajime, 4,176,901, Cl. 339-136.00M.
National Research Development Corporation: *See—*
Hewlett, Anthony M., 4,176,663, Cl. 128-204.260.
Thursby, Graham J., 4,177,092, Cl. 148-113.000.
National Semiconductor Corporation: *See—*
Hobrecht, Stephen W., 4,177,432, Cl. 330-252.000.
Nelson, Carl T., 4,177,095, Cl. 148-175.000.
National Steel Corporation: *See—*
Sangster, William H., 4,176,994, Cl. 414-163.000.
Natomas Company: *See—*
Murray, Robert G.; and Gikis, Benjamin J., 4,176,465, Cl. 34-31.000.
Nattel, William, to GTE Sylvania Canada Limited. Electrical outlet box. 4,176,759, Cl. 220-3.940.
Nawata, Takanari: *See—*
Yonemitsu, Eiichi; Miyamori, Hiroshi; Nawata, Takanari; Fujioka, Tomio; Ito, Akira; and Kobayashi, Makoto, 4,177,247, Cl. 423-515.000.
NCR Corporation: *See—*
Armstrong, Rolfe D.; and Gillow, George B., 4,177,455, Cl. 340-347.0DD.
Jenkins, Alfred D.; and Schade, Edward W., Jr., 4,177,515, Cl. 364-200.000.
Sacher, Eric; and Trebelhorn, Thomas E., 4,176,780, Cl. 235-302.000.
Neal, Michael G.: *See—*
Ernster, Peter J.; Schaefer, George H.; and Neal, Michael G., 4,176,971, Cl. 366-298.000.
Nedelec, Lucien; Frechet, Daniel; Dumont, Claude; and Hunt, Peter, to Roussel Uclaf. Novel 5H-benzocyclohepten-7-amines. 4,177,292, Cl. 424-330.000.
Nefedov, Askold I.: *See—*
Gebel, Iosif D.; Zykov, Arkady A.; Nefedov, Askold I.; Parshikov, Viktor I.; and Khrolenko, Viktor F., 4,176,461, Cl. 33-178.00D.
Neff, Randall B., to Hewlett-Packard Company. Calculator apparatus having a single-step key for displaying and executing program steps and displaying the result. 4,177,520, Cl. 364-900.000.
Neidhardt, Manfred; and Rehfeld, Gerhard, to Dynamit Nobel Aktiengesellschaft. Method of manufacturing electrically fused corundum. 4,177,235, Cl. 264-140.000.
Neil, Clyde C.: *See—*
Hammer, Jacob M.; and Neil, Clyde C., 4,176,551, Cl. 73-339.00R.
Neiman S.A.: *See—*
Lipschutz, Paul, 4,176,867, Cl. 292-201.000.
Nelson, Albin J., to Pfizer Inc. 1,5-Disubstituted-2-pyrrolidones. 4,177,346, Cl. 542-427.000.
Nelson, Carl T., to National Semiconductor Corporation. Process for fabricating an integrated circuit subsurface zener diode utilizing conventional processing steps. 4,177,095, Cl. 148-175.000.
Nelson & Johnson Engineering: *See—*
Stevenson, Grant E., 4,176,597, Cl. 100-244.000.
Nemag, B.V.: *See—*
van Huuksloot, Leendert, 4,176,872, Cl. 294-70.000.
Nemoto, Tsuneo; and Toyoshima, Kiichiro, to Sony Corporation. Reel for tape. 4,176,804, Cl. 242-68.500.
Neotec Corporation: *See—*
Carpenter, Frank M., 4,176,916, Cl. 350-315.000.
Nersasian, Arthur: *See—*
Arhart, Richard J.; and Nersasian, Arthur, 4,177,223, Cl. 525-331.000.
Nestler, Heinz: *See—*
Schoenafinger, Eduard; Deigner, Paul; Koester, Eberhard; Ohlinger, Manfred; Schaefer, Dieter; Stumpfi, Werner; Amort, Juergen; Seiler, Claus-Dietrich; Nestler, Heinz; and Ambros, Otto, 4,177,317, Cl. 428-405.000.
Neuenschwander, Rudolf, to Scott Paper Company. Web forming apparatus employing intermediate web forming and spreading section. 4,176,426, Cl. 19-306.000.
Neuenschwander, Rudolf, to Scott Paper Company. Web forming apparatus employing spreading section. 4,176,427, Cl. 19-306.000.
Neumann, Fred F.: *See—*
Thomas, Rudy; and Neumann, Fred F., 4,176,809, Cl. 242-107.40A.
Neumann, Ullrich; and Rudolph, Kurt. Process for purge stream treatment in removal of sulfur dioxide. 4,177,244, Cl. 423-242.000.
Neuray, Dieter: *See—*
Tacke, Peter; Neuray, Dieter; and Michael, Dietrich, 4,177,185, Cl. 260-38.000.
Newsday, Inc.: *See—*
Targe, David M., 4,176,862, Cl. 283-64.000.
Ng, Hon-Hei F.: *See—*
Clipston, Robert H.; Hall, Emerson O.; and Ng, Hon-Hei F., 4,177,303, Cl. 427-259.000.
NGK Insulators, Ltd.: *See—*
Torii, Yukio; and Nakamura, Takao, 4,177,307, Cl. 428-116.000.
Nicholl, Thomas H.; and Collins, John J., to Nicholl, Thomas H. Power failure light and circuit therefor. 4,177,500, Cl. 362-20.000.
Nichols Engineering & Research Corp.: *See—*
von Dreusche, Charles F., Jr.; and Barry, Louis T., 4,176,611, Cl. 110-225.000.
Niedermeyer, Karl O. Through flow sump pump. 4,177,021, Cl. 417-424.000.
Niederprum, Hans: *See—*
Mitschke, Karl-Heinz; Niederprum, Hans; and Kapps, Manfred, 4,177,332, Cl. 521-98.000.

Nifco, Inc.: *See*—
Kimura, Shigeru, 4,176,428, Cl. 24-73.00P.
Nihon Advanced Products Kabushiki Kaisha: *See*—
Wakatake, Yoshimasa, 4,177,458, Cl. 340-373.000.
Nilsson, Erik G., to Swegea Maschinen AG. Band cutting apparatus. 4,176,568, Cl. 83-187.000.
Nippon Electric Co., Ltd.: *See*—
Kodama, Yukuo, 4,176,516, Cl. 58-23.00R.
Nippon Gakki Seizo Kabushiki Kaisha: *See*—
Yamada, Shigeru; and Ichikawa, Kiyoshi, 4,176,577, Cl. 84-1.010.
Nippon Kogaku K.K.: *See*—
Hagiuda, Nobuyoshi; and Tanaka, Hiroaki, 4,176,924, Cl. 352-174.000.
Mori, Ikuo, 4,176,915, Cl. 350-220.000.
Nakamura, Soichi; and Hayashi, Kiyoshi, 4,176,913, Cl. 350-214.000.
Watanabe, Sakuji, 4,176,933, Cl. 354-127.000.
Nippon Oil Company, Ltd.: *See*—
Sato, Hisatake, 4,177,076, Cl. 106-32.000.
Uemura, Seiichi; Yamamoto, Syunichi; Hirose, Takao; Takashima, Hiroaki; Kato, Osamu; and Nagi, Minoru, 4,177,132, Cl. 208-22.000.
Nippon Soken, Inc.: *See*—
Kawai, Hisasi; and Ina, Toshikazu, 4,176,629, Cl. 123-32.0EC.
Noguchi, Masaaki; Tanaka, Yukiyasu; and Tanaka, Taro, 4,176,650, Cl. 123-198.00F.
Shinoda, Yoshio; Kuno, Akira; and Kuroyama, Toshinobu, 4,177,454, Cl. 340-309.400.
Nippon Steel Corporation: *See*—
Obi, Tatsuro; Koyama, Teruo; Tanaka, Tadashi; and Hasegawa, Atsushi, 4,177,323, Cl. 428-622.000.
Nippondenso Co., Ltd.: *See*—
Kozuka, Kazuhiro; Yamamoto, Shin; Huruhashi, Mikio; Iwaki, Katsutaro; and Asari, Susumu, 4,177,366, Cl. 200-19.0DR.
Norimatsu, Hideaki; and Sato, Yoshiaki, 4,176,626, Cl. 123-32.0EE.
Suzuki, Masatosi; Soda, Kazuya; and Nakamura, Yasuo, 4,177,112, Cl. 204-1.00T.
Nishida, Takashi: *See*—
Kotera, Nobuo; Oi, Tetsu; and Nishida, Takashi, 4,177,372, Cl. 219-121.00L.
Nishimura, Masahiro: *See*—
Nojima, Hiroshi; and Nishimura, Masahiro, 4,176,703, Cl. 152-209.00B.
Nishimura, Sanji: *See*—
Watanabe, Morio; and Nishimura, Sanji, 4,177,119, Cl. 204-151.000.
Nishizawa, Jun-ichi, to Semiconductor Research Foundation. Single crystal of semiconductive material on crystal of insulating material. 4,177,321, Cl. 428-446.000.
Nissan Motor Company, Limited: *See*—
Kitamura, Hidetoshi; and Sato, Jun, 4,176,638, Cl. 123-119.00A.
Nivison, John L.: *See*—
Muccigrosso, Vincent J.; Nivison, John L.; and Oberg, Albert E., 4,177,399, Cl. 313-368.000.
Noddings, John; and Cox, Michael D., to Associated Engineering Limited. Electrical protection circuits. 4,177,492, Cl. 361-31.000.
Noethe, Bjoern, to Siemens Aktiengesellschaft. Optical ribbon cables. 4,176,910, Cl. 350-96.230.
Nogimura, Tsunehisa, to Kabushiki Kaisha Kawai Gakki Seisakusho. Frequency divider for tone source apparatus for Arabian scale in electronic organ. 4,176,574, Cl. 84-1.010.
Noguchi, Masaaki; Tanaka, Yukiyasu; and Tanaka, Taro, to Nippon Soken, Inc. Method for operating a multi-cylinder jump-spark ignition engine and operation control system thereof. 4,176,650, Cl. 123-198.00F.
Nojima, Hiroshi; and Nishimura, Masahiro, to Bridgestone Tire Company Limited. Pneumatic tire having lug pattern. 4,176,703, Cl. 152-209.00B.
Nolte, David G.; and Brown, Winthrop K., to Texaco Inc. Sonic leak detector and method. 4,176,543, Cl. 73-40.50A.
Nordendale, Paul A. Wall safe lock. 4,176,533, Cl. 70-115.000.
Nordisk Insulinlaboratorium: *See*—
Hansen, Jorgen F., 4,177,188, Cl. 260-122.000.
Nordskog, Robert A. Self-propelled aircraft passenger elevator. 4,176,732, Cl. 187-9.00E.
Norimatsu, Hideaki; and Sato, Yoshiaki, to Nippondenso Co., Ltd. Air-fuel ratio feedback control system. 4,176,626, Cl. 123-32.0EE.
Norin, Ake: *See*—
Eriksson, Ake; and Norin, Ake, 4,176,657, Cl. 126-401.000.
Norman, Jan L.: *See*—
Brown, David A.; Norman, Jan L.; and Whitson, Donald W., 4,177,461, Cl. 340-628.000.
Northern Telecom Limited: *See*—
Gillissie, Michael J. E., 4,176,751, Cl. 211-41.000.
Northrop Corporation: *See*—
Eguchi, Ronald G., 4,177,404, Cl. 315-151.000.
Headley, Jack W.; Skow, Andrew M.; and Titiriga, Andrew, Jr., 4,176,813, Cl. 244-130.000.
Nortn-Harty Colliery Engineering Limited: *See*—
Wallace, Walter M.; and Craven, Geoffrey F., 4,176,749, Cl. 209-457.000.
Notari, Bruno: *See*—
Manara, Giovanni; Notari, Bruno; and Fattore, Vittorio, 4,177,167, Cl. 252-455.00R.
Notifier Company: *See*—
Hubert, Gustav, 4,176,618, Cl. 116-102.000.
Nozaki, Kenzie, to Shell Oil Company. 1-Octen-7-yne production. 4,177,220, Cl. 585-505.000.
Nussbaum, Marvin L.; and Knaggs, Edward A., to Stepan Chemical Company. Petroleum sulfonates. 4,177,207, Cl. 260-504.00R.
N.V. Klippan S.A.: *See*—
Thomas, Rudy; and Neumann, Fred F., 4,176,809, Cl. 242-107.40A.
O&K Orenstein & Koppel Aktiengesellschaft: *See*—
Alpers, Gunther; and Bentz, Helmut, 4,176,887, Cl. 305-57.000.
Oberg, Albert E.: *See*—
Muccigrosso, Vincent J.; Nivison, John L.; and Oberg, Albert E., 4,177,399, Cl. 313-368.000.
Obi, Tatsuro; Koyama, Teruo; Tanaka, Tadashi; and Hasegawa, Atsushi, to Nippon Steel Corporation; and Sakuranomiya Chemical Co., Ltd. Coated metal sheet for use in producing a drawn and ironed can body. 4,177,323, Cl. 428-622.000.
O'Brien, Vincent J.: *See*—
Holzhauser, Ronald C.; Zirngibl, Carl H.; and O'Brien, Vincent J., 4,176,945, Cl. 355-23.000.
Obuch, Edward A., to Amerace Corporation. Electrical terminal. 4,176,904, Cl. 339-192.00R.
Occidental Oil Shale, Inc.: *See*—
Studebaker, Irving G.; and Hutchins, Ned M., 4,176,882, Cl. 299-2.000.
Ochmann, Rudolf: *See*—
Hermeyer, Bernd; and Ochmann, Rudolf, 4,177,406, Cl. 315-307.000.
Ochocki, Wlodzimierz: *See*—
Bielecki, Marek; Bogdanski, Andrzej; Buxakowski, Andrzej; Chudzinski, Janusz; Glogowski, Andrzej; Kopczynski, Marian; Krolikowski, Andrzej; Kryszewski, Jozef; Moczulski, Zdzislaw; Ochocki, Wlodzimierz; Pomorski, Aleksander; Rumatowski, Karol; Sawicki, Janusz; Szostakowski, Henryk; Warowny, Tadeusz; Wisniewski, Teofil; and Wozniak, Antoni, 4,176,624, Cl. 123-32.0EA.
Oddo, Luigi G. Electronic engine wear detector. 4,176,545, Cl. 73-64.000.
O'Dell, C. Allen: *See*—
Shealy, Y. Fulmer; and O'Dell, C. Allen, 4,177,348, Cl. 544-317.000.
Ofengenden, Abram M.: *See*—
Krupman, Leonid I.; Yaroslavtsev, Jury G.; Sochnev, Alexandr E.; Shamil, Jury P.; Khitrik, Abram I.; Antipenko, Grigory I.; Smetanin, Jury G.; Samsonov, Albert N.; Ljudkovsky, Vadim M.; Pokrass, Leonid M.; Kurdjukov, Anatoly A.; Ofengenden, Abram M.; and Zhitnik, Georgy G., 4,177,070, Cl. 75-257.000.
Ogata, Kiichi: *See*—
Mishima, Takao; Semba, Shoji; Ogata, Kiichi; and Funahashi, Osamu, 4,176,532, Cl. 68-19.000.
Ogren, Sven O.: *See*—
Lindberg, Ulf H. A.; Ross, Svante B.; Thorberg, Seth O.; and Ogren, Sven O., 4,177,291, Cl. 424-330.000.
Ohdan, Kyoji: *See*—
Umemura, Sumio; Ohdan, Kyoji; Sakai, Fumihiko; Bando, Yasuo; and Ikezawa, Harumi, 4,177,161, Cl. 252-435.000.
Ohio Agricultural Research and Development Center: *See*—
Holmes, Robert G., 4,176,750, Cl. 209-699.000.
Ohlinger, Manfred: *See*—
Schoenafinger, Eduard; Deigner, Paul; Koester, Eberhard; Ohlinger, Manfred; Schaefer, Dieter; Stumpfi, Werner; Amort, Juergen; Seiler, Claus-Dietrich; Nestler, Heinz; and Ambros, Otto, 4,177,317, Cl. 428-405.000.
Ohmura, Ryuichi, to Fuji Kogyo Co., Ltd. Line guide ring. 4,176,488, Cl. 43-24.000.
Ohtani, Kazuo: *See*—
Akai, Norio; Inoue, Nobumasa; and Ohtani, Kazuo, 4,176,847, Cl. 274-39.00R.
Oi, Tetsu: *See*—
Kotera, Nobuo; Oi, Tetsu; and Nishida, Takashi, 4,177,372, Cl. 219-121.00L.
Shigeta, Junji; Oi, Tetsu; Kotera, Nobuo; Nakashima, Muneyasu; and Miyamoto, Nobuo, 4,177,298, Cl. 427-85.000.
Oji Paper Co., Ltd.: *See*—
Hata, Yukinori; Watanabe, Tsutomu; and Itoh, Fumio, 4,177,073, Cl. 430-188.000.
Okabayashi, Keiichi: *See*—
Shinoda, Osamu; Okabayashi, Keiichi; and Nagai, Takanori, 4,176,639, Cl. 123-136.000.
Okabe, Katsuhiko, to Copal Company Limited. Device for intermittently driving printing rings in a printer. 4,176,599, Cl. 101-95.000.
Okamoto, Yoshinori: *See*—
Gotoh, Isamu; Okamoto, Yoshinori; and Wakatsuki, Goroei, 4,176,648, Cl. 123-179.00S.
Okazaki, Hiroshi: *See*—
Okumura, Tomisaburo; Okazaki, Hiroshi; and Tsuchitani, Akira, 4,177,096, Cl. 148-187.000.
Okita, Koichi, to Sumitomo Electric Industries, Ltd. Microporous tubes. 4,177,334, Cl. 521-145.000.
Oku, Nobuyuki, to Itoki Kosakusho Co., Ltd. Automatic positioning system for a carriage in a storage and retrieval system. 4,176,996, Cl. 414-273.000.
Okumura, Tomisaburo; Okazaki, Hiroshi; and Tsuchitani, Akira, to Matsushita Electronics Corporation. Method for manufacturing a semiconductor integrated circuit device. 4,177,096, Cl. 148-187.000.
Olander, Emil E., Jr.; James, Rex L.; Larson, Ivar W.; Covington, Wayne F.; Walden, Jack M.; Watson, Robert E.; Yockey, Francis J.; Wenninger, Fred, Jr.; and Russell, Homer C., to Hewlett-Packard

Company. Programmable calculator including scrolling alphanumeric display means. 4,177,518, Cl. 364-710.000.
Olearczyk, Francis J., deceased: *See—*
Seven, Manfred K.; and Olearczyk, Francis J., deceased, 4,177,336, Cl. 525-325.000.
Olearczyk, Jean R., administratrix: *See—*
Seven, Manfred K.; and Olearczyk, Francis J., deceased, 4,177,336, Cl. 525-325.000.
Oleck, Stephen M.; and Sherry, Howard S., to Mobil Oil Corporation. Supported catalyst for demetalation and desulfurization of hydrocarbon oils. 4,177,163, Cl. 252-439.000.
Olin Corporation: *See—*
Dotson, Ronald L.; and Lynch, Richard W., 4,177,115, Cl. 204-78.000.
Kuo, Han C., 4,177,129, Cl. 204-290.00R.
Olszewski, Jerzy A.; and Ramy, Towheed, to General Cable Corporation. Reliable sheath bonding connector and method of making. 4,176,893, Cl. 339-14.00R.
Olympus Optical Company Limited: *See—*
Tojo, Tsutomu, 4,176,912, Cl. 350-175.0ML.
Omron Tateisi Electronics Co.: *See—*
Takenaka, Kunio, 4,176,556, Cl. 73-362.0AR.
Yasutake, Akira, 4,176,917, Cl. 350-336.000.
Ondetti, Miguel A.; and Condon, Michael E., to E. R. Squibb & Sons, Inc. Method for alleviating hypertension. 4,177,277, Cl. 424-263.000.
O'Neal, Chester L.; and O'Neal, Danny C. Disposable toothbrush and dentifrice combination. 4,176,980, Cl. 401-162.000.
O'Neal, Danny C.: *See—*
O'Neal, Chester L.; and O'Neal, Danny C., 4,176,980, Cl. 401-162.000.
Onishi, Masaru: *See—*
Katakabe, Noboru; Yamaguchi, Isao; and Onishi, Masaru, 4,176,940, Cl. 355-10.000.
Onizawa, Masao, to Sanyo Trading Co., Ltd. Vulcanizable rubber compositions and vulcanized rubber prepared therefrom. 4,177,337, Cl. 525-331.000.
Ono, Yoshihiro; Harada, Shigeo; Mizobuchi, Yuzo; and Ikeda, Tomoaki, to Fuji Photo Film Co., Ltd. Process for preparing a lithographic printing plate with a thiourea wetting solution. 4,177,072, Cl. 430-302.000.
Orel, Jeannette V. Self-acting smoke sorbing device. 4,177,045, Cl. 55-102.000.
Oren, Amiram: *See—*
Bartoov, Benjamin; Mayevsky, Abraham; Mendel, Shmuel; and Oren, Amiram, 4,176,953, Cl. 356-73.000.
Oronzio DeNora Impianti Elettrochimici S.p.A.: *See—*
DeNora, Oronzio; and Pellegri, Alberto, 4,177,116, Cl. 204-98.000.
Ortho Pharmaceutical Corporation: *See—*
Chen, Robert H. K., 4,177,194, Cl. 260-333.000.
Osorio, Manuel M. Composition for and method of causing rainfall. 4,176,790, Cl. 239-2.00R.
Ossman, John: *See—*
Kromer, Heiner M.; and Ossman, John, 4,176,968, Cl. 366-97.000.
Osterman, Ralph G.: *See—*
Rivers, Morris R.; Osterman, Ralph G.; and Warmuth, George H., 4,177,048, Cl. 55-275.000.
O'Sullivan, Rita. Visual teaching aid for number concept. 4,176,474, Cl. 35-73.000.
Oswald, Alexis A.: *See—*
Daniher, Francis A.; and Oswald, Alexis A., 4,177,289, Cl. 424-300.000.
Otani, Akira, to Sharp Kabushiki Kaisha. Variable cooking mode selector in a microwave oven. 4,177,370, Cl. 219-10.55B.
Ott, Richard R.: *See—*
Roesel, John F., Jr.; Ott, Richard R.; and Barber, Ronnie J., 4,177,414, Cl. 322-28.000.
Otteblad, Sven I. A.; Brynielsson, Erner T. O.; Dovertie, Ralph G.; Franzen, Stig E. R.; and Brelen, Hans E. O., to AB Volvo. Combined automatic and manual guidance system. 4,176,728, Cl. 180-168.000.
Ovshinsky, Stanford R., to Energy Conversion Devices, Inc. Amorphous semiconductor member and method of making the same. 4,177,473, Cl. 357-2.000.
Ovshinsky, Stanford R., to Energy Conversion Devices, Inc. High temperature amorphous semiconductor member and method of making the same. 4,177,474, Cl. 357-2.000.
Owens, Malcolm P.: *See—*
Knox, Lee H.; Owens, Malcolm P.; and Ure, George R., 4,176,711, Cl. 165-105.000.
Knox, Lee H.; and Owens, Malcolm P., 4,176,712, Cl. 165-105.000.
Owens, Roger W.: *See—*
Hickey, Robert F.; and Owens, Roger W., 4,177,144, Cl. 210-86.000.
Oxford Industries, Inc.: *See—*
Patterson, Thomas K.; Mitchell, William O.; Smith, Donald H.; and Hunter, John P., Jr., 4,176,566, Cl. 83-29.000.
Ozawa, Kaoru: *See—*
Kasubuchi, Takeshi; Ozawa, Kaoru; and Hara, Takeo, 4,177,519, Cl. 364-712.000.
Ozawa, Takashi: *See—*
Takenouchi, Mutsuo; Ozawa, Takashi; Wako, Syoji; and Itoh, Satoru, 4,177,487, Cl. 358-294.000.
P. R. Mallory & Co. Inc.: *See—*
Dey, Arabinda N.; Miller, John S.; and Bowden, William L., 4,177,329, Cl. 429-101.000.
Mathews, John P.; and Smith, Michael J., 4,177,327, Cl. 429-27.000.
Pack, Paul R., to Harsco Corporation. Method for removing oil from mill scale and recovering metallic values therein. 4,177,062, Cl. 75-28.000.
Pageau, Lucien: *See—*
Thayer, William L.; Pageau, Lucien; and Sourirajan, Srinivasa, 4,177,031, Cl. 425-460.000.
Pagnozzi, Ernesto G.; and Pagnozzi, Vincenzo. Apparatus for drying timber. 4,176,466, Cl. 34-233.000.
Pagnozzi, Vincenzo: *See—*
Pagnozzi, Ernesto G.; and Pagnozzi, Vincenzo, 4,176,466, Cl. 34-233.000.
Pains-Wessex Limited: *See—*
King, Colin M.; Goddard, Michael R.; and Murray, Dudley C., 4,176,606, Cl. 102-37.400.
Pall Corporation: *See—*
Rosenberg, David J., 4,177,149, Cl. 210-436.000.
Panafacom Limited: *See—*
Yamaguchi, Taihei, 4,177,451, Cl. 340-147.00R.
Panknin, Walter; Finsterwalder, Kurt; Kannegiesser, Reinhard; and Bassler, Hans, to L. Schuler GmbH. Device for producing a bead on the circumference of a hollow cylinder. 4,176,536, Cl. 72-91.000.
Pannaci, Karl E.: *See—*
Anderson, Harvey G.; and Pannaci, Karl E., 4,176,430, Cl. 26-96.000.
Pannell, Calvin E., to Dow Chemical Company, The. Purification of polymer solution. 4,177,343, Cl. 528-482.000.
Parker, Robert H., to W. H. Brady Co. Apparatus for separating laminated layers. 4,177,104, Cl. 156-584.000.
Parshikov, Viktor I.: *See—*
Gebel, Iosif D.; Zykov, Arkady A.; Nefedov, Askold I.; Parshikov, Viktor I.; and Khrolenko, Viktor F., 4,176,461, Cl. 33-178.00D.
Passedroit, Hubert: *See—*
Boy, Aristide; Galy, Henri; Ivaldi, Raoul; and Passedroit, Hubert, 4,177,208, Cl. 260-504.00S.
Paton, Boris E.; Medovar, Boris I.; Tsukanov, Georgy E.; Bogachenko, Alexei G.; Artamonov, Viktor L.; Timashov, Grigory A.; Shtanko, Jury P.; Marchenko, Alexandr M.; Fedorovsky, Boris B.; Kumysh, Ilya I.; Chepurnoi, Anatoly D.; Saenko, Vladimir Y.; and Semin-Vadov, Gennady M., to Institut Elektrosvarki Imeni E.O. Patona Akademii Nauk Ukrainskoi SSR. Method for producing a non-split metal workpiece formed as a cast hollow billet with a bottom part. 4,177,058, Cl. 75-10.00C.
Patterson, James; and Farrar, Peter G. G., to Rolls-Royce Limited. Compressor rotor stage. 4,177,013, Cl. 416-193.00A.
Patterson, Thomas K.; Mitchell, William O.; Smith, Donald H.; and Hunter, John P., Jr., to Oxford Industries, Inc. Creel loading and cutting system. 4,176,566, Cl. 83-29.000.
Pattyn, Herman A.: *See—*
De Brabandere, Luc A.; Borginon, Hendrik A.; Pattyn, Herman A.; and Pollet, Robert J., 4,177,071, Cl. 430-494.000.
Paul, James E., to Rockwell International Corporation. Adaptive noise cancelling receiver. 4,177,430, Cl. 325-475.000.
Payrhammer, Bernd, to AGFA-Gevaert, A.G. Correctly positioning successive originals of a photographic strip at a copying or severing station. 4,176,944, Cl. 355-18.000.
Payrhammer, Bernd: *See—*
Knor, Bernhard; Payrhammer, Bernd; and Treiber, Helmut, 4,176,964, Cl. 356-444.000.
Pearson, James H.: *See—*
Ryan, Allen L.; Jansons, Eric G.; Halliburton, Ronald D.; and Pearson, James H., 4,176,844, Cl. 273-121.00A.
Pech, Zdenek: *See—*
Forman, Ladislav; Pech, Zdenek; and Vondruska, Vaclav, 4,177,293, Cl. 426-43.000.
Pedain, Josef: *See—*
Bock, Manfred; Pedain, Josef; Slawyk, Wilhelm; and Konig, Klaus, 4,177,342, Cl. 528-45.000.
Pellegri, Alberto: *See—*
DeNora, Oronzio; and Pellegri, Alberto, 4,177,116, Cl. 204-98.000.
Pennington, Charles A. Device for scoring wood panels prior to sawing. 4,176,572, Cl. 83-862.000.
Pennington, William. Plastic sheet sealing process and apparatus. 4,177,100, Cl. 156-157.000.
Pennwalt Corporation: *See—*
Bohen, Joseph M., 4,177,187, Cl. 260-45.75S.
Bohen, Joseph M., 4,177,198, Cl. 260-399.000.
Mageli, Orville L.; and Swarts, William A., 4,177,204, Cl. 260-453.0RZ.
Toukan, Sameeh S.; and Hauptschein, Murray, 4,177,351, Cl. 548-325.000.
Pepper, Terry W.; and Bocckino, Harry G., to Texasgulf Inc. Recovery of silver, copper and zinc from partially roasted pyrite concentrate by ferric sulphate leaching. 4,177,067, Cl. 75-104.000.
Perez, Leo: *See—*
Goebel, Bert; and Perez, Leo, 4,176,407, Cl. 2-20.000.
Perin, Philippe, to Societe Fiat France, S.A. Devices for automatically coupling implements to self-propelled articles. 4,176,727, Cl. 180-53.00R.
Perr, Julius P., to Cummins Engine Company, Inc. Aneroid for a turbocharged engine. 4,176,641, Cl. 123-140.0FG.
Perret, Maurice, to Gesellschaft fur elektronische Rohren Comet Bern. Variable electric capacitor. 4,177,495, Cl. 361-279.000.
Perser, Donald A.; and Roman, Donald A., to Ballert Orthopedic Corp. Foot elevation measuring device. 4,176,459, Cl. 33-174.0CD.

Person, Abraham: *See—*
Wetmore, Sherman B.; McNary, James F.; and Person, Abraham, 4,176,722, Cl. 175-7.000.
Petersen, Louis P.: *See—*
Razzano, John S.; Petersen, Louis P.; and Ashby, Bruce A., 4,177,200, Cl. 260-448.20N.
Peterson, Dean M., to Honeywell Inc. Recorder with electrically conductive paper. 4,177,469, Cl. 346-110.00R.
Peterson, James J., to Kendall Company, The. Urine collection device. 4,176,412, Cl. 4-144.100.
Peterson, Richard H. Circuit for simulating reverberation in electronic organs. 4,176,579, Cl. 84-1.240.
Pfister, Rudolf: *See—*
Hromatka, Otto; Binder, Dieter; Pfister, Rudolf; and Zeller, Paul, 4,177,193, Cl. 549-64.000.
Pfizer Inc.: *See—*
Nelson, Albin J., 4,177,346, Cl. 542-427.000.
Sarges, Reinhard, 4,177,282, Cl. 424-273.00R.
Pfleger, Klaus: *See—*
Boettcher, Klaus; Hoerdt, Heinrich G.; Pfleger, Klaus; Zacher, Wieland; and Gropper, Hans, 4,177,340, Cl. 526-329.000.
Philip Morris Incorporated: *See—*
Van Auken, Thomas V.; Grubbs, Harvey J.; and Johnson, William R., Jr., 4,177,339, Cl. 526-314.000.
Philipp, Adolf H.; and Jirkovsky, Ivo L., to Ayerst McKenna & Harrison Ltd. 2-Substituted-3-methyl-γ-pyrone tricyclic derivatives and process therefor. 4,177,284, Cl. 424-275.000.
Philips, Nicholas A. Hinged fishing lure. 4,176,490, Cl. 43-42.150.
Phillips Petroleum Company: *See—*
Irvin, Howard B.; Sherk, Fred T.; and Hoffman, Alfred A., Jr., 4,177,250, Cl. 423-573.00G.
McDaniel, Max P.; and Welch, Melvin B., 4,177,162, Cl. 252-439.000.
Murtha, Timothy P.; Jones, William A.; and Zuech, Ernest A., 4,177,164, Cl. 252-455.00Z.
Murtha, Timothy P.; and Zuech, Ernest A., 4,177,165, Cl. 252-455.00Z.
Murtha, Timothy P.; and Zuech, Ernest A., 4,177,166, Cl. 252-455.00Z.
Pieper, Christian; Sandhu, Surinder S.; Schummer, Gunter; and Feltgen, Karlheinz, to Bayer Aktiengesellschaft. Process for the recovery of dimethylacylamides. 4,177,111, Cl. 203-14.000.
Pierrel, Michel, to Pont-a-Mousson S.A. Process and installation for heat treating spheroidal or lamellar graphite cast iron pipes. 4,177,088, Cl. 148-15.000.
Pilipski, Mark. Low pressure alarm. 4,176,617, Cl. 116-70.000.
Pinkus, Alan E. Wrist support. 4,176,839, Cl. 273-29.00A.
Pioneer Electronic Corporation: *See—*
Takaoka, Saburo, 4,177,411, Cl. 318-314.000.
Piorkow, Alfred: *See—*
Kocher, Robert C.; and Piorkow, Alfred, 4,176,925, Cl. 354-1.000.
Pittman, Turner J. Inflatable enclosure and energy exchange system. 4,176,653, Cl. 126-428.000.
Pizzini, Louis C.: *See—*
Austin, Arthur L.; Levis, William W., Jr.; Pizzini, Louis C.; and Hartman, Robert J., 4,177,335, Cl. 521-171.000.
Pleion Corporation: *See—*
Gartung, Clifford W., 4,176,889, Cl. 312-195.000.
Plessey Handel und Investments AG: *See—*
Martin, Barrie J., 4,176,634, Cl. 123-119.0EE.
Wallace, Malcolm R., 4,177,033, Cl. 431-78.000.
Podesta, Armando. Gasket for closure caps for containers. 4,176,757, Cl. 215-341.000.
Poggemiller, Erhard; and Sweet, Ralph, to Kep Enterprises; and Sweet Manufacturing Ltd. Depth control for ground working agricultural implements. 4,176,721, Cl. 172-4.000.
Pohl, Louis; and Westerhoff, Heinz, to Pohl, Louis. Pipe string connection for high load operation. 4,176,864, Cl. 285-181.000.
Poignant, Jean-Claude: *See—*
Regnier, Gilbert; Canevari, Roger; Laubie, Michel; and Poignant, Jean-Claude, 4,177,272, Cl. 424-250.000.
Pokrass, Leonid M.: *See—*
Krupman, Leonid I.; Yaroslavtsev, Jury G.; Sochnev, Alexandr E.; Shamil, Jury P.; Khitrik, Abram I.; Antipenko, Grigory I.; Smetanin, Jury G.; Samsonov, Albert N.; Ljudkovsky, Vadim M.; Pokrass, Leonid M.; Kurdjukov, Anatoly A.; Ofengenden, Abram M.; and Zhitnik, Georgy G., 4,177,070, Cl. 75-257.000.
Polaroid Corporation: *See—*
Gordon, Michael E.; and Stieger, Frank, 4,177,330, Cl. 429-152.000.
Young, Warren H.; Drevitch, Nolan A.; and Rosati, Anthony G., 4,176,932, Cl. 354-126.000.
Politechnika Poznanska: *See—*
Bielecki, Marek; Bogdanski, Andrzej; Buxakowski, Andrzej; Chudzinski, Janusz; Glogowski, Andrzej; Kopczynski, Marian; Krolikowski, Andrzej; Kryszewski, Jozef; Moczulski, Zdzislaw; Ochocki, Wlodzimierz; Pomorski, Aleksander; Rumatowski, Karol; Sawicki, Janusz; Szostakowski, Henryk; Warowny, Tadeusz; Wisniewski, Teofil; and Wozniak, Antoni, 4,176,624, Cl. 123-32.0EA.
Polk, Matthew S., Jr. Loudspeaker-cable interface. 4,177,431, Cl. 330-149.000.
Pollet, Robert J.: *See—*
De Brabandere, Luc A.; Borginon, Hendrik A.; Pattyn, Herman A.; and Pollet, Robert J., 4,177,071, Cl. 430-494.000.
Polycold Systems, Inc.: *See—*
Missimer, Dale J., 4,176,526, Cl. 62-278.000.
Polymer Research, Inc.: *See—*
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Pomorski, Aleksander: *See—*
Bielecki, Marek; Bogdanski, Andrzej; Buxakowski, Andrzej; Chudzinski, Janusz; Glogowski, Andrzej; Kopczynski, Marian; Krolikowski, Andrzej; Kryszewski, Jozef; Moczulski, Zdzislaw; Ochocki, Wlodzimierz; Pomorski, Aleksander; Rumatowski, Karol; Sawicki, Janusz; Szostakowski, Henryk; Warowny, Tadeusz; Wisniewski, Teofil; and Wozniak, Antoni, 4,176,624, Cl. 123-32.0EA.
Pont-a-Mousson S.A.: *See—*
Pierrel, Michel, 4,177,088, Cl. 148-15.000.
Poppelsdorf, Fedor, to Union Carbide Corporation. Process for preparing bis(N,N-dialkylamino)alkyl ethers employing sulfur oxychloro-containing compounds. 4,177,212, Cl. 260-584.00R.
Popper, Karel; and Camirand, Wayne M. Methods and apparatus for continuously endowing liquid with mechanical energy by osmosis. 4,177,146, Cl. 210-137.000.
Popplewell, Alan F., deceased (by Popplewell, Margaret R., legal representative); and Clark, David R., to Ciba-Geigy Corporation. Additives for water-based functional fluids. 4,177,155, Cl. 252-49.300.
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Popplewell, Alan F., deceased; and Clark, David R., 4,177,155, Cl. 252-49.300.
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Fosner, Emerson O.; and Post, Vernon L., 4,176,470, Cl. 35-22.00A.
Power, Douglas P. Cooking pan for baking pizza pies and like food products. 4,176,591, Cl. 99-430.000.
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Powers, Frank M.: *See—*
Chadwick, Kenneth E.; Chia, E. Henry; and Powers, Frank M., 4,177,085, Cl. 148-2.000.
PPG Industries, Inc.: *See—*
Das, Suryya K.; and Kania, Charles M., 4,177,178, Cl. 260-29.40A.
Radzwill, John, 4,177,099, Cl. 156-99.000.
Rahn, Henry W., 4,177,128, Cl. 204-243.00R.
Precise Power Corporation: *See—*
Roesel, John F., Jr.; Ott, Richard R.; and Barber, Ronnie J., 4,177,414, Cl. 322-28.000.
Precision Screen Machines, Inc.: *See—*
Szarka, Sandor, 4,176,601, Cl. 101-115.000.
Prehn, Lawrence D. Facsimile apparatus. 4,177,485, Cl. 358-259.000.
Prehn, Lawrence D. Facsimile device. 4,177,486, Cl. 358-259.000.
Premier Industrial Corporation: *See—*
Allenbaugh, George G., Jr., 4,176,794, Cl. 239-498.000.
Primus-Sievert AB: *See—*
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Priou, Alain: *See—*
Deficis, Alain; Gimonet, Marie-Edith; Priou, Alain; and Fournet-Fayas, Christian, 4,177,422, Cl. 324-95.000.
Pro-Tech, Inc.: *See—*
McClure, Charles L., 4,176,550, Cl. 73-302.000.
Process Engineering, Inc.: *See—*
Schultz, Jeffrey A., 4,177,017, Cl. 417-231.000.
Prolss, Ludwig, to Kilcher-Chemie AG. Method of production of a micro-porous membrane for filtration plants. 4,177,228, Cl. 264-24.000.
Proskow, Stephen, to Du Pont de Nemours, E. I., and Company. Butadiene/acrylonitrile photosensitive, elastomeric polymer compositions for flexographic printing plates. 4,177,074, Cl. 430-286.000.
Proust, Francois O.: *See—*
Clin, Francois H.; Gony, Jean-Noel; and Proust, Francois O., 4,176,799, Cl. 241-74.000.
Prunier, Jean-Claude, to Souriau et Cie. Processes for preparing a connector end on a fiber bundle optical cable and cables thus obtained. 4,176,909, Cl. 350-96.200.
Pullman Incorporated: *See—*
Nagy, Ernest J., 4,176,497, Cl. 49-411.000.
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Pyke, Thomas R.; and Salmond, Marion P., to Upjohn Company, The. Process for preparing 3aα-H-4α-[3'-propanol]-7aβ-methylhexahydro-1,5-indanedione hemiketal. 4,177,106, Cl. 435-125.000.
Quarz-Zeit AG: *See—*
Stein, Manfred; and Busch, Dieter, 4,176,515, Cl. 58-19.00R.
Queen, David S.: *See—*
Smith, John B.; Bell, Peter W.; Queen, David S.; and Mitchell, John, 4,177,311, Cl. 428-246.000.
Quere, Eugene M.; and Le Rolland, Pierre M., to ITT Industries, Inc. Assembly process of electrodes in an insulating material. 4,176,446, Cl. 29-622.000.
Quest Automation Limited: *See—*
Eadie, David W.; and Hancock, Charles J., 4,176,926, Cl. 354-4.000.
Raber, Robert R., Jr.: *See—*
Culbert, Robert M.; and Raber, Robert R., Jr., 4,177,050, Cl. 55-499.000.
Radzwill, John, to PPG Industries, Inc. Method of bonding polyurethane sheeting to acrylic or polyurethane sheeting in production of transparent windows. 4,177,099, Cl. 156-99.000.

Rae, Donald A. Book with removable three dimensional figurines. 4,176,473, Cl. 35-35.00E.
Rahn, Henry W., to PPG Industries, Inc. Cathode element for use in aluminum reduction cell. 4,177,128, Cl. 204-243.00R.
Raisson, Gerard D.: *See—*
Honnorat, Yves C.; Raisson, Gerard D.; and Morlet, Jean G., 4,177,026, Cl. 425-7.000.
Ramy, Towheed: *See—*
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Ranco Incorporated: *See—*
Gliatas, Themistocles H., 4,176,823, Cl. 251-306.000.
Randam Electronics, Inc.: *See—*
Stevens, William M., 4,177,378, Cl. 250-252.000.
Randolph, George J. J. Method and apparatus for the controlled drying of lumber and the like. 4,176,464, Cl. 34-16.500.
Rankin, Frank S.: *See—*
Burrill, Peter M.; and Rankin, Frank S., 4,177,176, Cl. 260-29.20M.
Rarick, Charles H.: *See—*
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Rasen, Alfred; Vollbrecht, Rolf; and Schenesse, Klemens, to Akzona Inc. Matting article. 4,177,312, Cl. 428-284.000.
Rasheed, Khalid; and Warkentin, James D., to Ansul Company, The. Soil fungicidal (nitrogen heterocyclic)-substituted-1,3-benzodithiole-2-ones. 4,177,270, Cl. 424-248.510.
Raske, Walter O. A. Lever holding device for fuel dispensing nozzle assembly. 4,176,695, Cl. 141-96.000.
Rast, Howard E., Jr., to United States of America, Navy. Passive high-speed automatic shutter for imaging devices. 4,176,919, Cl. 350-354.000.
Ray, Charles M.: *See—*
Barr, Dwight L.; Barr, Leslie A.; Swett, Benson P.; and Ray, Charles M., 4,176,873, Cl. 296-156.000.
Raychem Corporation: *See—*
Diaz, Stephen H., 4,177,446, Cl. 338-212.000.
Horsma, David A.; Lyons, Bernard J.; and Smith-Johannsen, Robert, 4,177,376, Cl. 219-553.000.
Raytheon Company: *See—*
Cappon, Arthur M., 4,177,390, Cl. 307-205.000.
Keene, Wayne H.; Rudko, Robert I.; and Sonnenschein, Charles M., 4,176,959, Cl. 356-325.000.
Razzano, John S.; Petersen, Louis P.; and Ashby, Bruce A., to General Electric Company. Silyl phosphates as neutralizing agents for alkali metal hydroxides. 4,177,200, Cl. 260-448.20N.
RCA Corporation: *See—*
Forster, Gerhard, 4,177,393, Cl. 307-270.000.
Haferl, Peter E., 4,177,392, Cl. 307-254.000.
Hammer, Jacob M.; and Neil, Clyde C., 4,176,551, Cl. 73-339.00R.
Hammer, Jacob M., 4,176,552, Cl. 73-339.00R.
McCandless, Harry E., 4,176,432, Cl. 29-25.160.
Reading and Bates Construction Co.: *See—*
Cherrington, Martin D., 4,176,985, Cl. 405-184.000.
Reagan, William R., to Lo-Jack Corporation. Auto theft detection system. 4,177,466, Cl. 343-112.0TC.
Realty & Industrial Corporation: *See—*
Shepard, Francis H., Jr., 4,176,977, Cl. 400-320.000.
Rebsdat, Siegfried; Mayer, Sigmund; Alfranseder, Josef; and Riedl, Josef, to Hoechst Aktiengesellschaft. Process for improving the activity of used supported silver catalysts. 4,177,169, Cl. 252-476.000.
Recognition Equipment Incorporated: *See—*
Ingram, James R., Jr.; and Kiesel, George A., 4,176,855, Cl. 235-480.000.
Redding, Robert J. Analysis instruments. 4,176,542, Cl. 73-23.100.
Redington Inc.: *See—*
Vogel, Walter H., 4,176,741, Cl. 198-457.000.
Reed, Frank A., deceased; and by Diemert, Paul M., executor, to Diemert, Paul M. Fluent material handling apparatus. 4,176,987, Cl. 406-10.000.
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Regent Marine & Instrumentation, Inc.: *See—*
Vigneron, Jean J., 4,177,467, Cl. 343-119.000.
Regie Nationale des Usines Renault: *See—*
Barnabe, Jean-Louis M., 4,177,125, Cl. 204-195.00S.
Marchaix, Raymond; and Le Cun, Alain, 4,176,678, Cl. 137-493.000.
Regnier, Gilbert; Canevari, Roger; Laubie, Michel; and Poignant, Jean-Claude, to Science Union et Cie. Disubstituted piperazines. 4,177,272, Cl. 424-250.000.
Rehfeld, Gerhard: *See—*
Neidhardt, Manfred; and Rehfeld, Gerhard, 4,177,235, Cl. 264-140.000.
Rehrig, Houston. Plastic child seat back for cart. 4,176,849, Cl. 280-33.99B.
Reid, Taylor A.: *See—*
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Reid, William R.; and Vitale, John, to Amtel, Inc. Mooring attachment for single point mooring terminals. 4,176,615, Cl. 114-230.000.
Reilly Tar & Chemical Corporation: *See—*
McGill, Charles K., 4,177,349, Cl. 546-255.000.
Remberg, Axel; and Triesch, Willi, to Kraftwerk Union Aktiengesellschaft. Installation for centering the inner housing of a steam turbine. 4,177,003, Cl. 415-108.000.
Remery, Michel, to U.S. Philips Corporation. Electronic starter for igniting a discharge lamp. 4,177,403, Cl. 315-101.000.
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Tokuno, Masateru, 4,177,102, Cl. 156-472.000.
Repetti, Pierre, to Systems and Technics S.A. Storing and feeding device for flat parts. 4,176,670, Cl. 133-4.00R.
Research Corporation: *See—*
Rosenberg, Barnett; VanCamp, Loretta; and Krigas, Thomas, 4,177,263, Cl. 424-131.000.
Research Council of Alberta, The: *See—*
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Rhodes, Donald E.; Baldwin, Roger A.; and Davis, Robert E., to Kerr-McGee Corporation. Separation technique in a coal deashing process. 4,177,134, Cl. 208-177.000.
Rhodes, Donald E., to Kerr-McGee Corporation. Use of specific coal components to improve soluble coal product yield in a coal deashing process. 4,177,135, Cl. 208-177.000.
Rhone-Poulenc Industries: *See—*
Jay, Pierre; and Bonhomme, Pierre, 4,177,156, Cl. 252-66.000.
Riccitiello, Salvatore R.; Sawko, Paul M.; and Estrella, Carlos A., to United States of America, National Aeronautics and Space Administration. Catalysts for polyimide foams from aromatic isocyanates and aromatic dianhydrides. 4,177,333, Cl. 521-124.000.
Rich, Brett, to Industrial Sales & Marketing Corporation. Railroad grade crossing platform and an end capping device therefor. 4,176,789, Cl. 238-8.000.
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Shaw, Richard A., 4,176,595, Cl. 99-638.000.
Richard, Wilfred T., to Stauffer Chemical Company. Production of sulfur dioxide from waste sulfuric acid. 4,177,248, Cl. 423-540.000.
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Schubert, Herbert; and Hiltebrandt, Siegfried, 4,176,661, Cl. 128-6.000.
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Richter Gedeon Vegyeszeti Gyar Rt.: *See—*
Tuba, Zoltan; Marsai, Maria; Biro, Katalin; Szporny, Laszlo; Karpati, Egon; and Szeberenyi, Szabolcs, 4,177,190, Cl. 260-239.500.
Rickards, Michael A.; Ruhe, Richard K.; Meyerhoff, Leonard; and Hook, James M., to Rohr Industries, Inc. Fixed geometry water jet inlet for a surface effect ship. 4,176,613, Cl. 114-67.00A.
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Ricoh Company, Ltd.: *See—*
Hasebe, Mitsuo, 4,176,943, Cl. 355-14.00R.
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Ridenour, Michael R., to Evans Products Company. Dual action control mechanism. 4,176,784, Cl. 236-86.000.
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Riedmiller, Charles F.; and Bobo, Melvin, to General Electric Company. Combined turbine shroud and vane support structure. 4,177,004, Cl. 415-116.000.
Rieter Machine Works Ltd.: *See—*
Lattmann, Werner; and Staheli, Paul, 4,176,988, Cl. 406-171.000.
Schwengeler, Peter, 4,176,512, Cl. 57-88.000.
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Ringle, Gerald D. Wheel alignment gauge assembly and adapter therefor. 4,176,463, Cl. 33-203.180.
Ritter, John C. Paint can corner filler. 4,176,768, Cl. 222-564.000.
Rivers, Morris R.; Osterman, Ralph G.; and Warmuth, George H., to Georgia-Pacific Corporation. Bearing breather desiccant device. 4,177,048, Cl. 55-275.000.
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Robert, Andre J.; Bourdon, Claude G.; Msika, Nessim C.; Chorlay, Etienne G.; and Euzenade, Jean-Louis, to Etat Francais as represented by the Pelegue General pour l'Armement. Rotating birefringent ellipsometer and its application to photoelasticimetry. 4,176,951, Cl. 356-33.000.
Robert Bosch GmbH: *See—*
Hellberg, Rainer; Steinke, Leo; and Fritz, Adolf, 4,176,644, Cl. 123-148.00E.
Hoefer, Friedrich-Wilhelm; Gerschwitz, Walter; and Schwerin, Guenther, 4,176,685, Cl. 137-596.130.
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Schwerin, Gunther, 4,176,688, Cl. 137-630.130.
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Roberts, Durward T., Jr., to Firestone Tire & Rubber Company, The. Method for forming side-wall strip in a tube. 4,177,233, Cl. 264-134.000.
Roberts Filter Manufacturing Company: *See—*
Roberts, Robert L., 4,177,147, Cl. 210-151.000.
Roberts, Marion L.; Sharpe, Max H.; and Krupnick, Albert C., to United States of America, National Aeronautics and Space Adminis-

tration. Aluminium or copper substrate panel for selective absorption of solar energy. 4,177,325, Cl. 428-629.000.
Roberts, Richard W., to Borg-Warner Corporation. Drive mechanism. 4,176,737, Cl. 192-82.00T.
Roberts, Robert L., to Roberts Filter Manufacturing Company. Biological treating systems. 4,177,147, Cl. 210-151.000.
Robertshaw Controls Company: *See*—
Cairo, Anthony C.; Tillmann, Ditmar K.; and Insley, Gene I., 4,176,903, Cl. 339-147.00R.
Jones, Richard E., 4,177,034, Cl. 431-264.000.
Robertson, George H., to Ciba-Geigy Corporation. Process for granulating pigment compositions. 4,177,082, Cl. 106-309.000.
Robins, Thomas L. Variable thrust controller for water jet propulsion system. 4,176,616, Cl. 115-14.000.
Robinson, David E.: *See*—
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Rock, Erich; and Mages, Bernhard, to Julius Blum Gesellschaft m.b.H. Furniture hinge. 4,176,422, Cl. 16-130.000.
Rock, Erich; and Mages, Bernhard, to Julius Blum Gesellschaft m.b.H. Hinge casing. 4,176,424, Cl. 16-148.000.
Rock, Erich; and Mages, Bernhard, to Julius Blum Gesellschaft m.b.H. Guide rail assembly for sliding doors. 4,176,496, Cl. 49-410.000.
Rockwell International Corporation: *See*—
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Clapper, Robert L.; Schoneweis, E. Frederick; Hankosky, Andrew; and Bake, Earl A., 4,176,981, Cl. 403-31.000.
Paul, James E., 4,177,430, Cl. 325-475.000.
Rodaway, Keith S., to Everest & Jennings, Inc. Wheelchair foot rest latch. 4,176,879, Cl. 297-429.000.
Rodgers, James W.: *See*—
Duggins, Richard W.; and Rodgers, James W., 4,176,452, Cl. 30-293.000.
Rodriguez, Manuel F. Faucet replacement valve stem assembly. 4,176,674, Cl. 137-315.000.
Rody, Jean; Greber, Gerd; and Muller, Helmut, to Ciba-Geigy Corporation. Stabilization of light-sensitive polymers. 4,177,186, Cl. 260-45.80N.
Roe, Thomas J. Marching guide. 4,176,471, Cl. 35-29.00R.
Roen, Richard A., to Research Council of Alberta, The. Oscillating arc welding. 4,177,373, Cl. 219-125.120.
Roesel, John F., Jr.; Ott, Richard R.; and Barber, Ronnie J., to Precise Power Corporation. Controllable voltage A.C. generator system. 4,177,414, Cl. 322-28.000.
Roger, Harry. Check valve. 4,176,679, Cl. 137-495.000.
Rogers Corporation: *See*—
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Rogers, Howard H., to United States of America, Air Force. Wall wick for nickel-hydrogen cell. 4,177,328, Cl. 429-81.000.
Rogers, John W. Coil breakaway device. 4,176,774, Cl. 225-103.000.
Rohm and Haas Company: *See*—
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Rohr Industries, Inc.: *See*—
Rickards, Michael A.; Ruhe, Richard K.; Meyerhoff, Leonard; and Hook, James M., 4,176,613, Cl. 114-67.00A.
Rolfe, Peter. Catheter with measurement electrodes. 4,176,659, Cl. 128-635.000.
Rolls-Royce Limited: *See*—
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Perser, Donald A.; and Roman, Donald A., 4,176,459, Cl. 33-174.00D.
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Romeo, Giriaco: *See*—
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Roozenbeek, Herman: *See*—
Jundt, Werner; Sohner, Gerhard; Werner, Peter; and Roozenbeek, Herman, 4,176,645, Cl. 123-148.00E.
Rosati, Anthony G.: *See*—
Young, Warren H.; Drevitch, Nolan A.; and Rosati, Anthony G., 4,176,932, Cl. 354-126.000.
Rosenberg, Barnett; VanCamp, Loretta; and Krigas, Thomas, to Research Corporation. Anti-animal tumor method. 4,177,263, Cl. 424-131.000.
Rosenberg, David J., to Pall Corporation. Filter assembly for intravenous liquid administration apparatus. 4,177,149, Cl. 210-436.000.
Rosenberg, Harvey S.; and Grotta, Henry M., to Battelle Development Corporation. Scale suppression in lime and limestone scrubbers. 4,177,245, Cl. 423-242.000.
Ross, Joseph A.; and Stern, Howard K., to Solid Photography Inc. Numerically controlled milling with parabolic profile tools for surface smoothness. 4,176,992, Cl. 409-131.000.
Ross, Svante B.: *See*—
Lindberg, Ulf H. A.; Ross, Svante B.; Thorberg, Seth O.; and Ogren, Sven O., 4,177,291, Cl. 424-330.000.
Rossi, Alberto: *See*—
Baschang, Gerhard; Stanek, Jaroslav; Rossi, Alberto; and Sele, Alex, 4,177,344, Cl. 536-4.000.
Rossi, Pietro P.: *See*—
Siclari, Francesco; Rossi, Pietro P.; Guaita, Cesare; and L'Acqua, Vito, 4,177,214, Cl. 260-601.00R.
Roth, Donald J., to Continental Group, Inc., The. Easy opening container unit having a domed end panel. 4,176,760, Cl. 220-359.000.
Roth, Johann; and Schneider, Peter, to Braun Aktiengesellschaft. Microphone arrangement in a sound movie camera. 4,176,922, Cl. 352-27.000.
Roth, Peter F. Vessel pump. 4,177,022, Cl. 417-424.000.
Rotork Limited: *See*—
Hore, Donald L., 4,177,395, Cl. 310-39.000.
Rottensteiner, Hans, to Lindauer Dornier Gesellschaft mbH. Apparatus for cleaning clamping surfaces. 4,176,429, Cl. 26-93.000.
Rousseau, Jean L. I., to Garrett Corporation, The. Adsorption air conditioner. 4,176,523, Cl. 62-2.000.
Roussel Uclaf: *See*—
Nedelec, Lucien; Frechet, Daniel; Dumont, Claude; and Hunt, Peter, 4,177,292, Cl. 424-330.000.
Roxby, Edwin H. Load-lifting and centering device. 4,176,818, Cl. 248-354.00H.
Rubinstein, Solomon, to General Cable Corporation. Standardized gland assembly for cable connections. 4,176,866, Cl. 285-421.000.
Rudko, Robert I.: *See*—
Keene, Wayne H.; Rudko, Robert I.; and Sonnenschein, Charles M., 4,176,959, Cl. 356-325.000.
Rudle, Manfred: *See*—
Stoll, Kurt; and Rudle, Manfred, 4,176,586, Cl. 92-5.00R.
Rudolph, Kurt: *See*—
Neumann, Ullrich; and Rudolph, Kurt, 4,177,244, Cl. 423-242.000.
Ruff, Glen T. Rotary-tiller tine cleaning tool. 4,176,417, Cl. 7-161.000.
Ruhe, Richard K.: *See*—
Rickards, Michael A.; Ruhe, Richard K.; Meyerhoff, Leonard; and Hook, James M., 4,176,613, Cl. 114-67.00A.
Rumatowski, Karol: *See*—
Bielecki, Marek; Bogdanski, Andrzej; Buxakowski, Andrzej; Chudzinski, Janusz; Glogowski, Andrzej; Kopczynski, Marian; Krolikowski, Andrzej; Kryszewski, Jozef; Moczulski, Zdzislaw; Ochocki, Wlodzimierz; Pomorski, Aleksander; Rumatowski, Karol; Sawicki, Janusz; Szostakowski, Henryk; Warowny, Tadeusz; Wisniewski, Teofil; and Wozniak, Antoni, 4,176,624, Cl. 123-32.0EA.
Runge, Thomas M. Cardiac assist device employing electrically stimulated artificial muscle. 4,176,411, Cl. 3-1.700.
Rupp, Charle R., to General Electric Company. Graph architecture information processing system. 4,177,514, Cl. 364-200.000.
Rusch, Reinhart: *See*—
Arndt, Friedrich; Kruger, Hans-Rudolf; and Rusch, Reinhart, 4,177,054, Cl. 71-90.000.
Russell, C. Paul; Gingo, Joseph M.; and Drica-Minieris, Oswald A., to Goodyear Tire & Rubber Company, The. Tire cord with a synthetic fiber core. 4,176,705, Cl. 152-359.000.
Russell, Homer C.: *See*—
Olander, Emil E., Jr.; James, Rex L.; Larson, Ivar W.; Covington, Wayne F.; Walden, Jack M.; Watson, Robert E.; Yockey, Francis J.; Wenninger, Fred, Jr.; and Russell, Homer C., 4,177,518, Cl. 364-710.000.
Ruston, Rudolf S.: *See*—
Markham, Michael H.; and Ruston, Rudolf S., 4,176,610, Cl. 109-59.00R.
Ruva, Frank D.: *See*—
Granatek, Edmund S.; Ruva, Frank D.; and Grab, Frederick L., 4,177,199, Cl. 260-430.000.
Ruzicka, Jan; Lorenz, Jindrich; Marek, Vladimir; and Tusl, Miroslav. Pencil sheath and composition therefor. 4,176,978, Cl. 401-96.000.
Ryan, Allen L.; Jansons, Eric G.; Halliburton, Ronald D.; and Pearson, James H., to Midway Mfg. Co. Multi-station pinball game. 4,176,844, Cl. 273-121.00A.
S I G Schweizerische Industrie-Gesellschaft: *See*—
Luginbuhl, Pierre, 4,176,993, Cl. 414-106.000.
S.R.M. Hydromekanik Aktiebolg: *See*—
Ahlen, Karl G.; Bergstrom, Per-Olof; and Supanich, Joseph, 4,176,564, Cl. 74-732.000.
Sacher, Eric; and Trebelhorn, Thomas E., to NCR Corporation. Method and apparatus for testing printed circuit boards. 4,176,780, Cl. 235-302.000.
Sachs Systemtechnik GmbH: *See*—
Tellert, Rudy, 4,177,494, Cl. 361-152.000.
Sacht, Hans O., to Gebruder Welger. Machine for forming a round bale of fibrous agricultural material. 4,176,596, Cl. 100-88.000.
Saenko, Vladimir Y.: *See*—
Paton, Boris E.; Medovar, Boris I.; Tsukanov, Georgy E.; Bogachenko, Alexei G.; Artamonov, Viktor L.; Timashov, Grigory A.; Shtanko, Jury P.; Marchenko, Alexandr M.; Fedorovsky, Boris B.; Kumysh, Ilya I.; Chepurnoi, Anatoly D.; Saenko, Vladimir Y.; and Semin-Vadov, Gennady M., 4,177,058, Cl. 75-10.00C.
Safety Consultants: *See*—
Kornhauser, Murray, 4,176,858, Cl. 280-734.000.
Safron Printing Company: *See*—
Giordano, Dennis R., 4,176,859, Cl. 283-8.00R.
Saida, Yasushi. Ball-point pen. 4,176,979, Cl. 401-100.000.
St. Denis, Andrew R.: *See*—
Mette, Klaus H.; and St. Denis, Andrew R., 4,177,517, Cl. 364-559.000.

St. Jean, Gerard: *See—*
Anderson, Clay H.; and St. Jean, Gerard, 4,176,827, Cl. 254-186.00R.
Sakai, Fumihiko: *See—*
Umemura, Sumio; Ohdan, Kyoji; Sakai, Fumihiko; Bando, Yasuo; and Ikezawa, Harumi, 4,177,161, Cl. 252-435.000.
Sakai, Koichi, to Matsushita Electric Industrial Co., Ltd. Magnetic recording and playback means with indication of tape remaining. 4,177,488, Cl. 360-72.300.
Sakakida, Koji; and Ikekawa, Tetsuro. Process for producing emitanin. 4,177,108, Cl. 435-74.000.
Sakakiyama, Takashi: *See—*
Tsurumi, Michio; Sakakiyama, Takashi; Tazaki, Kichiya; and Koyama, Masaoki, 4,177,181, Cl. 260-29.70H.
Sakuma, Kouhei; Ukigai, Toshiyuki; Yamashita, Tatsuji; and Yamaki, Osamu, to Lion Yushi Kabushiki Kaisha. Dispersant for coal into oils. 4,177,039, Cl. 44-51.000.
Sakuranomiya Chemical Co., Ltd.: *See—*
Obi, Tatsuro; Koyama, Teruo; Tanaka, Tadashi; and Hasegawa, Atsushi, 4,177,323, Cl. 428-622.000.
Salmond, Marion P.: *See—*
Pyke, Thomas R.; and Salmond, Marion P., 4,177,106, Cl. 435-125.000.
Salomon, Manfred: *See—*
Hintzmann, Kurt; Kaiser, Reinhold; Link, Wolfgang; Minner, Willy; Mutz, Dieter; Salomon, Manfred; and Wingert, Arnim, 4,177,480, Cl. 357-84.000.
Samsonov, Albert N.: *See—*
Krupman, Leonid I.; Yaroslavtsev, Jury G.; Sochnev, Alexandr E.; Shamil, Jury P.; Khitrik, Abram I.; Antipenko, Grigory I.; Smetanin, Jury G.; Samsonov, Albert N.; Ljudkovsky, Vadim M.; Pokrass, Leonid M.; Kurdjukov, Anatoly A.; Ofengenden, Abram M.; and Zhitnik, Georgy G., 4,177,070, Cl. 75-257.000.
Sanchez Torres, Silvestre. Muffler made of manganese alloy. 4,177,090, Cl. 148-32.000.
Sander, Harry: *See—*
Thummler, Ursus; Werner, Hugo; and Sander, Harry, 4,176,765, Cl. 222-218.000.
Sandhu, Surinder S.: *See—*
Pieper, Christian; Sandhu, Surinder S.; Schummer, Gunter; and Feltgen, Karlheinz, 4,177,111, Cl. 203-14.000.
Sandlin, Rolf H.: *See—*
Albrektsson, Kjell A.; Eriksson, Bertil T.; Eriksson, Sven W.; Franzen, Hans A. E.; and Sandlin, Rolf H., 4,176,814, Cl. 244-3.150.
Sandoz, Inc.: *See—*
Bennett, Gregory B., 4,177,273, Cl. 424-250.000.
Sangster, William H., to National Steel Corporation. Coke oven charging apparatus. 4,176,994, Cl. 414-163.000.
Sansui Electric Co., Ltd.: *See—*
Fujimoto, Yasuhiro; and Suzuki, Masao, 4,177,360, Cl. 179-100.41M.
Sanyo Trading Co., Ltd.: *See—*
Onizawa, Masao, 4,177,337, Cl. 525-331.000.
Sarges, Reinhard, to Pfizer Inc. Hydantoin therapeutic agents. 4,177,282, Cl. 424-273.00R.
Sarkes Tarzian, Inc.: *See—*
Valdettaro, Alarico A., 4,177,429, Cl. 325-459.000.
Sarrand, Pierre, to Compagnie Internationale pour l'Informatique Cii - Honeywell Bull (Societe Anonyme). Process and method to initiate a receiving and transmitting station linked by a connecting channel of an information exchange system consisting of several transmitting and receiving stations. 4,177,450, Cl. 340-147.0LP.
Sarrut, Jean P., to CECA S.A.; and Le Carbone Lorraine. Method of extinguishing metal fires. 4,177,152, Cl. 252-2.000.
Sarvis Oy: *See—*
Aho, Leo E., 4,176,747, Cl. 206-509.000.
Sasaki, Hiroharu: *See—*
Hayashi, Masaaki; Tsuneta, Kazuyoshi; Takada, Hiroshi; Kenmotsu, Nobuhiro; and Sasaki, Hiroharu, 4,177,174, Cl. 260-18.0PN.
Sasaki, Shiro; Yasumatsu, Jun; and Inukai, Mitsuo, to Toyota Jidosha Kogyo Kabushiki Kaisha; and Kabushiki-Kaisha Tokai-Rika-Denki-Seisakusho. Passenger restraining seat belt retractor. 4,176,808, Cl. 242-107.100.
Sasse, Klaus: *See—*
Seng, Florin; Sasse, Klaus; Beck, Gunther; Eue, Ludwig; and Schmidt, Robert R., 4,177,055, Cl. 71-92.000.
Sato, Hisatake, to Nippon Oil Company, Ltd. Water or alcohol soluble printing ink composition. 4,177,076, Cl. 106-32.000.
Sato, Jun: *See—*
Kitamura, Hidetoshi; and Sato, Jun, 4,176,638, Cl. 123-119.00A.
Sato, Kozi, to Toyo Ink Manufacturing Co., Ltd. Photopolymerizable hydroxy-benzophenone derivative compounds and photocurable compositions. 4,177,122, Cl. 204-159.160.
Sato, Kunio: *See—*
Kobayashi, Mituki; Awao, Takao; Mizusaki, Yujiro; Sato, Kunio; Kato, Akio; and Mituishi, Hisao, 4,177,069, Cl. 75-213.000.
Sato, Yo, to Kabushiki Kaisha Sato. Type positioning mechanism for printing device. 4,176,600, Cl. 101-111.000.
Sato, Yo, to Kabushiki Kaisha Sato Kenkyusho. Label strip inserting device. 4,176,603, Cl. 101-291.000.
Sato, Yoshiaki: *See—*
Norimatsu, Hideaki; and Sato, Yoshiaki, 4,176,626, Cl. 123-32.0EE.
Sauder Industries, Inc.: *See—*
Sauder, Robert A., 4,177,036, Cl. 432-247.000.
Sauder, Robert A., to Sauder Industries, Inc. High temperature industrial furnace. 4,177,036, Cl. 432-247.000.
Sawada, Takeshi; and Inoue, Takeshi, to Hitachi Metals, Inc. Cold-roll forming stand. 4,176,539, Cl. 72-178.000.
Sawicki, Janusz: *See—*
Bielecki, Marek; Bogdanski, Andrzej; Buxakowski, Andrzej; Chudzinski, Janusz; Glogowski, Andrzej; Kopczynski, Marian; Krolikowski, Andrzej; Kryszewski, Jozef; Moczulski, Zdzislaw; Ochocki, Wlodzimierz; Pomorski, Aleksander; Rumatowski, Karol; Sawicki, Janusz; Szostakowski, Henryk; Warowny, Tadeusz; Wisniewski, Teofil; and Wozniak, Antoni, 4,176,624, Cl. 123-32.0EA.
Sawko, Paul M.: *See—*
Riccitiello, Salvatore R.; Sawko, Paul M.; and Estrella, Carlos A., 4,177,333, Cl. 521-124.000.
Sawyer, Robert J. Picture frame assembly. 4,176,481, Cl. 40-156.000.
Sca Development Aktiebolag: *See—*
Wappling, Rune A., 4,176,619, Cl. 118-410.000.
Scalera, Frank T.; and Krakauer, Merrill. Drive system for rotary merchandise carriers. 4,176,762, Cl. 221-81.000.
Schaaf, Robert L.; Kan, Peter T.; and Cenker, Moses, to BASF Wyandotte Corporation. Process for the preparation of highly stable liquid carbodiimide-containing polyisocyanate compositions. 4,177,205, Cl. 260-453.0AM.
Schaaf, Robert L.: *See—*
Christopher, Robert J.; and Schaaf, Robert L., 4,177,433, Cl. 330-265.000.
Schade, Edward W., Jr.: *See—*
Jenkins, Alfred D.; and Schade, Edward W., Jr., 4,177,515, Cl. 364-200.000.
Schaefer, Dieter: *See—*
Schoenafinger, Eduard; Deigner, Paul; Koester, Eberhard; Ohlinger, Manfred; Schaefer, Dieter; Stumpfi, Werner; Amort, Juergen; Seiler, Claus-Dietrich; Nestler, Heinz; and Ambros, Otto, 4,177,317, Cl. 428-405.000.
Schaefer, Edwin M., III, to Bell Telephone Laboratories, Incorporated. Output timing arrangement for single-wall magnetic domain apparatus. 4,177,521, Cl. 365-8.000.
Schaefer, George H.: *See—*
Ernster, Peter J.; Schaefer, George H.; and Neal, Michael G., 4,176,971, Cl. 366-298.000.
Schaefl, Hans, to HFM Hohenloher Fahrzeuge- und Maschinenvertrieb GmbH. Amphibious vehicle. 4,176,726, Cl. 180-15.000.
Schamberg, Eckehard; Fock, Jurgen; Klocker, Otto; and Esselborn, Eberhard, to Th. Goldschmidt AG. Substrate-less, thermosetting synthetic resin foil. 4,177,221, Cl. 525-244.000.
Schardt, Gunter: *See—*
Diegelmann, Winfried; Schardt, Gunter; Klatt, Jochen; and Grolz, Heinz, 4,177,316, Cl. 428-367.000.
Schenesse, Klemens: *See—*
Rasen, Alfred; Vollbrecht, Rolf; and Schenesse, Klemens, 4,177,312, Cl. 428-284.000.
Schering Aktiengesellschaft: *See—*
Arndt, Friedrich; Kruger, Hans-Rudolf; and Rusch, Reinhart, 4,177,054, Cl. 71-90.000.
Kolbel, Herbert; and Tillmetz, Klaus D., 4,177,203, Cl. 260-449.60R.
Schlangen, Andrew J.; McClead, Jerry W.; and Garavalia, Thomas A., to Trane Company, The. Centrifugal blower control apparatus. 4,177,007, Cl. 415-160.000.
Schlossmann, Klaus: *See—*
Bossert, Friedrich; Wehinger, Egbert; Heise, Arend; Kazda, Stanislav; Stoepel, Kurt; Towart, Robertson; Vater, Wulf; and Schlossmann, Klaus, 4,177,278, Cl. 424-266.000.
Schmid, Eberhard, to Siemens Aktiengesellschaft. Apparatus for balancing an asymmetrical load. 4,177,508, Cl. 363-78.000.
Schmidt, Andreas, to Ciba-Geigy Corporation. Process for benzylating ketones. 4,177,213, Cl. 260-590.00R.
Schmidt, Robert R.: *See—*
Seng, Florin; Sasse, Klaus; Beck, Gunther; Eue, Ludwig; and Schmidt, Robert R., 4,177,055, Cl. 71-92.000.
Schneider, Abraham: *See—*
Janoski, Edward J.; Mitchell, Richard E.; and Schneider, Abraham, 4,177,217, Cl. 585-253.000.
Schneider, Peter: *See—*
Roth, Johann; and Schneider, Peter, 4,176,922, Cl. 352-27.000.
Schoenafinger, Eduard; Deigner, Paul; Koester, Eberhard; Ohlinger, Manfred; Schaefer, Dieter; Stumpfi, Werner; Amort, Juergen; Seiler, Claus-Dietrich; Nestler, Heinz; and Ambros, Otto, to BASF Aktiengesellschaft. Stabilization of chromium dioxide magnetic pigments. 4,177,317, Cl. 428-405.000.
Scholl, Hans-Joachim; and Dieterich, Dieter, to Bayer Aktiengesellschaft. Polyisocyanates containing sulphonic acid and phosphonate groups. 4,177,206, Cl. 260-456.00P.
Scholz, Manfred; Strie, Lothar; and Stendenbach, Karl-Heinz, to Hoechst Aktiengesellschaft. Method of repairing a defective coated workpiece. 4,176,437, Cl. 29-402.120.
Schoneweis, E. Frederick: *See—*
Clapper, Robert L.; Schoneweis, E. Frederick; Hankosky, Andrew; and Bake, Earl A., 4,176,981, Cl. 403-31.000.
Schott, Heinrich, to Siemens Aktiengesellschaft. Power supply system with two regulated power supply devices connected in parallel at an output. 4,177,389, Cl. 307-64.000.
Schrape, Peter: *See—*
Allert, Anton; Weiss, Friedrich; and Schrape, Peter, 4,176,562, Cl. 74-563.000.

Schubert, Herbert; and Hiltebrandt, Siegfried, to Richard Wolf GmbH. Photoendoscope having a distal electronic flash-tube guard. 4,176,661, Cl. 128-6.000.

Schuda, Felix J.: *See—*
Wright, Dave L.; Schuda, Felix J.; and Spranza, Joseph J., III, 4,176,892, Cl. 316-19.000.

Schultz, Jeffrey A., to Process Engineering, Inc. Pump system for cryogenic liquid delivery vehicles. 4,177,017, Cl. 417-231.000.

Schulz, Manfred; and Kappler, Gudrun, to Daimler-Benz Aktiengesellschaft. Water drainage spout, especially for hollow spaces in motor vehicle structures. 4,176,877, Cl. 296-208.000.

Schulz, Ralf-Thilo; Brunsch, Klaus; and Lemmer, Ludwig, to Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung. Laminated sectional girder of fiber-reinforced materials. 4,177,306, Cl. 428-107.000.

Schulz, Siegfried: *See—*
Christoph, Dieter, 4,176,565, Cl. 82-12.000.

Schumacher, Ernest W., to Virginia Chemicals Inc. Two-way filter-drier for heat pump systems. 4,177,145, Cl. 210-136.000.

Schummer, Gunter: *See—*
Pieper, Christian; Sandhu, Surinder S.; Schummer, Gunter; and Feltgen, Karlheinz, 4,177,111, Cl. 203-14.000.

Schunk & Ebe GmbH: *See—*
Diegelmann, Winfried; Schardt, Gunter; Klatt, Jochen; and Grolz, Heinz, 4,177,316, Cl. 428-367.000.

Schussler, Hans: *See—*
Bischoff, Erich; Dangel, Jurgen; Schussler, Hans; Ricker, Thomas; and Stein, Erich, 4,176,442, Cl. 29-571.000.

Schwartz, Edward: *See—*
Antonucci, Ermen S.; Cadden, Duane L.; Regenbrecht, Albert; and Schwartz, Edward, 4,176,891, Cl. 316-2.000.

Schwartz, Joel; and Fleming, Joseph P., to Diamond Shamrock Corporation. Process for production of phosphate rock slurries having reduced water content and viscosity. 4,177,243, Cl. 423-167.000.

Schwebke, Donald D. Jack device for trailers. 4,176,825, Cl. 254-94.000.

Schweiger, Richard G. Process for preparing a sulfate ester of a polyhydroxy polymer. 4,177,345, Cl. 536-59.000.

Schwengeler, Peter, to Rieter Machine Works Ltd. Rotor braking apparatus at each spinning unit of an open-end spinning machine. 4,176,512, Cl. 57-88.000.

Schwerin, Guenther: *See—*
Hoefer, Friedrich-Wilhelm; Gerschwitz, Walter; and Schwerin, Guenther, 4,176,685, Cl. 137-596.130.

Schwerin, Gunther, to Robert Bosch GmbH. Check valve. 4,176,688, Cl. 137-630.130.

Schwerko, Albert P.: *See—*
Herrington, Daniel R.; and Schwerko, Albert P., 4,177,136, Cl. 208-215.000.

SCI Systems, Inc.: *See—*
King, Olin B., 4,177,472, Cl. 346-162.000.

Science Union et Cie: *See—*
Regnier, Gilbert; Canevari, Roger; Laubie, Michel; and Poignant, Jean-Claude, 4,177,272, Cl. 424-250.000.

Scott, Lawrence S. Apparatus for automatic inflation of diver flotation means. 4,176,418, Cl. 9-313.000.

Scott Paper Company: *See—*
Neuenschwander, Rudolf, 4,176,426, Cl. 19-306.000.
Neuenschwander, Rudolf, 4,176,427, Cl. 19-306.000.

Scudder, Roy; and Bowes, Alan, to FMC Corporation. Conveyor system for a harvester. 4,176,511, Cl. 56-330.000.

Sears Manufacturing Company: *See—*
Koutsky, L. John, 4,176,878, Cl. 297-115.000.

SeaTek Corporation: *See—*
Goss, Wilbur H.; and Bergman, Gunnar B., 4,176,614, Cl. 114-125.000.

Sebrosky, Robert A.: *See—*
DeBoskey, Wentzle R.; and Sebrosky, Robert A., 4,176,975, Cl. 400-124.000.

Seeley, Elwin W.; and Hildebrand, Verne E., to United States of America, Navy. Inflatable cavity-backed annular slot transmitting antenna. 4,177,468, Cl. 343-710.000.

Seiberling, Mildred Kelly: *See—*
Seiberling, Theophilus K., 4,176,702, Cl. 152-209.00R.

Seiberling, Theophilus K., to Seiberling, Mildred Kelly, a part interest. Tire treads and their manufacture. 4,176,702, Cl. 152-209.00R.

Seibt, Willie, to Sherritt Gordon Mines Limited. Method of electroforming sheets and self-stripping cathode. 4,177,113, Cl. 204-12.000.

Seidel, William C., to Du Pont de Nemours, E. I., and Company. Recovery of triarylboranes. 4,177,215, Cl. 260-606.50B.

Seiler, Claus-Dietrich: *See—*
Schoenafinger, Eduard; Deigner, Paul; Koester, Eberhard; Ohlinger, Manfred; Schaefer, Dieter; Stumpfl, Werner; Amort, Juergen; Seiler, Claus-Dietrich; Nestler, Heinz; and Ambros, Otto, 4,177,317, Cl. 428-405.000.

Seiling, Samuel O., to AMF Incorporated. Dough divider. 4,177,030, Cl. 425-238.000.

Selden, Peter H.; Duerkop, Joachim; Albrecht, Wolfgang; and Weissenmayer, Heinz, to BASF Aktiengesellschaft. Molding core for the manufacture of hollow bodies consisting of fiber-reinforced synthetic resin. 4,177,032, Cl. 425-468.000.

Sele, Alex: *See—*
Baschang, Gerhard; Stanek, Jaroslav; Rossi, Alberto; and Sele, Alex, 4,177,344, Cl. 536-4.000.

SEM Israel Limited: *See—*
Bartoov, Benjamin; Mayevsky, Abraham; Mendel, Shmuel; and Oren, Amiram, 4,176,953, Cl. 356-73.000.

Semba, Shoji: *See—*
Mishima, Takao; Semba, Shoji; Ogata, Kiichi; and Funahashi, Osamu, 4,176,532, Cl. 68-19.000.

Semiconductor Research Foundation: *See—*
Nishizawa, Jun-ichi, 4,177,321, Cl. 428-446.000.

Semin-Vadov, Gennady M.: *See—*
Paton, Boris E.; Medovar, Boris I.; Tsukanov, Georgy E.; Bogachenko, Alexei G.; Artamonov, Viktor L.; Timashov, Grigory A.; Shtanko, Jury P.; Marchenko, Alexandr M.; Fedorovsky, Boris B.; Kumysh, Ilya I.; Chepurnoi, Anatoly D.; Saenko, Vladimir Y.; and Semin-Vadov, Gennady M., 4,177,058, Cl. 75-10.00C.

Senes, Albert, to Alsthom-Atlantique. Amplifying gate thyristor with gate turn-off (G.T.O.). 4,177,478, Cl. 357-38.000.

Seng, Florin; Sasse, Klaus; Beck, Gunther; Eue, Ludwig; and Schmidt, Robert R., to Bayer Aktiengesellschaft. 1-Acyloxymethyl-4,5-dichloro-imidazole-2-carboxylic acid derivatives and their use as plant protection agents. 4,177,055, Cl. 71-92.000.

Seven, Manfred K.; and Olearczyk, Francis J., deceased (by Olearczyk, Jean R., administratrix), to Allied Chemical Corporation, by said Manfred K. Seven. Preparation of polyolefin containing multiple olefinic unsaturation and carboxylic acid groups and polyolefin so prepared. 4,177,336, Cl. 525-325.000.

Severo-Kavkazsky Gorno-Metallurgichesky Institut: *See—*
Yagupov, Alexandr V., 4,176,795, Cl. 241-21.000.

Severus, Harald; and Birkmaier, Horst, to Swiss Aluminium Ltd. Aluminum or aluminum alloy article and process. 4,177,299, Cl. 427-287.000.

Severus-Laubenfeld, Harald, to Swiss Aluminium Ltd. Device for the production of anodized material. 4,177,127, Cl. 204-207.000.

SGS-ATES Componenti Elettronici S.p.A.: *See—*
Iannuzzi, Giulio; deMartiis, Carlo C.; Del Bo, Vittorio; and Gandolfi, Luciano, 4,176,443, Cl. 29-589.000.

Shadbolt, Philip; and Ganszczyk, Helen, to Letraset USA Inc. Dry transfer materials. 4,177,309, Cl. 428-195.000.

Shamil, Jury P.: *See—*
Krupman, Leonid I.; Yaroslavtsev, Jury G.; Sochnev, Alexandr E.; Shamil, Jury P.; Khitrik, Abram I.; Antipenko, Grigory I.; Smetanin, Jury G.; Samsonov, Albert N.; Ljudkovsky, Vadim M.; Pokrass, Leonid M.; Kurdjukov, Anatoly A.; Ofengenden, Abram M.; and Zhitnik, Georgy G., 4,177,070, Cl. 75-257.000.

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Shaw GMC Trucks Ltd.: *See—*
Mason, Ralph I., 4,177,516, Cl. 364-431.000.

Shaw, Richard A., to Richard A. Shaw, Inc. Apparatus and method for coring cauliflower heads. 4,176,595, Cl. 99-638.000.

Shealy, Y. Fulmer; and O'Dell, C. Allen, to United States Government. Carbocyclic analogs of cytosine nucleosides. 4,177,348, Cl. 544-317.000.

Sheldahl, Inc.: *See—*
Jackson, Martin A., 4,176,805, Cl. 242-75.460.

Shell Oil Company: *See—*
Condon, Nancy J., 4,177,184, Cl. 260-32.60A.
Nozaki, Kenzie, 4,177,220, Cl. 585-505.000.

Shepard, Francis H., Jr., to Realty & Industrial Corporation. Proportional carrier control and moving mechanism for electric typewriter. 4,176,977, Cl. 400-320.000.

Sherk, Fred T.: *See—*
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Sherman, Michael I.: *See—*
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Sherritt Gordon Mines Limited: *See—*
Seibt, Willie, 4,177,113, Cl. 204-12.000.

Sherry, Howard S.: *See—*
Oleck, Stephen M.; and Sherry, Howard S., 4,177,163, Cl. 252-439.000.

Shields, Santos, to Dresser Industries, Inc. Earth boring cutting element enhanced retention system. 4,176,725, Cl. 175-374.000.

Shigeta, Junji; Oi, Tetsu; Kotera, Nobuo; Nakashima, Muneyasu; and Miyamoto, Nobuo, to Hitachi, Ltd. Method for producing an InSb thin film element. 4,177,298, Cl. 427-85.000.

Shimizu, Masami: *See—*
Kozuki, Susumu; Uchidoi, Masanori; Date, Nobuaki; Shimizu, Masami; Aizawa, Hiroshi; and Takishima, Yoshiyuki, 4,176,936, Cl. 354-38.000.

Shindo, Isao: *See—*
Maeda, Yoshio; Matsumoto, Koichi; Fukuda, Kenji; and Shindo, Isao, 4,176,957, Cl. 356-319.000.

Shinoda, Osamu; Okabayashi, Keiichi; and Nagai, Takanori, to Toyota Jidosha Kogyo Kabushikikaisha. Evaporative emission system for improving engine starting characteristics. 4,176,639, Cl. 123-136.000.

Shinoda, Yoshio; Kuno, Akira; and Kuroyama, Toshinobu, to Nippon Soken, Inc.; and Toyota Jidosha Kogyo Kabushiki Kaisha. Digital display system. 4,177,454, Cl. 340-309.400.

Shinto Paint Co., Ltd.: *See—*
Siozawa, Nobuo; Kikuchi, Uhee; Kimura, Suguru; Todoroki, Nobuaki; Yasukawa, Jun-ichi; and Kamiyama, Satoru, 4,177,123, Cl. 204-181.00C.

Shipinski, John H., to Deere & Company. Diesel engine starting control. 4,176,642, Cl. 123-140.00R.

Shores, Marvin W., to General Dynamics Corporation. Phase-normalized parallel tuned receiver channel system. 4,177,427, Cl. 325-369.000.

Short, Larry E.: *See—*
Divins, Larry A.; and Short, Larry E., 4,177,241, Cl. 423-20.000.

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Kobayashi, Mituki; Awao, Takao; Mizusaki, Yujiro; Sato, Kunio; Kato, Akio; and Mituishi, Hisao, 4,177,069, Cl. 75-213.000.

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Shtanko, Jury P.: *See—*
Paton, Boris E.; Medovar, Boris I.; Tsukanov, Georgy E.; Bogachenko, Alexei G.; Artamonov, Viktor L.; Timashov, Grigory A.; Shtanko, Jury P.; Marchenko, Alexandr M.; Fedorovsky, Boris B.; Kumysh, Ilya I.; Chepurnoi, Anatoly D.; Saenko, Vladimir Y.; and Semin-Vadov, Gennady M., 4,177,058, Cl. 75-10.00C.

Siclari, Francesco; Rossi, Pietro P.; Guaita, Cesare; and L'Acqua, Vito, to Snia Viscosa Societa' Nazionale Industria Applicazioni Viscosa S.p.A. Procedure for the preparation of saturated and unsaturated dialdehydes. 4,177,214, Cl. 260-601.00R.

Sidlaw Industries Limited: *See—*
Smith, John B.; Bell, Peter W.; Queen, David S.; and Mitchell, John, 4,177,311, Cl. 428-246.000.

Siegfried Aktiengesellschaft: *See—*
Zirngibl, Ludwig; and Thiele, Kurt, 4,177,350, Cl. 546-278.000.

Siemens Aktiengesellschaft: *See—*
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Noethe, Bjoern, 4,176,910, Cl. 350-96.230.
Schmid, Eberhard, 4,177,508, Cl. 363-78.000.
Schott, Heinrich, 4,177,389, Cl. 307-64.000.

Sigmon, Thomas W.: *See—*
Lau, Silvanus S.; Mayer, James W.; and Sigmon, Thomas W., 4,177,084, Cl. 148-1.500.

Sillars, Frederick S.: *See—*
Gorini, Robert F.; Johnson, Herbert; and Sillars, Frederick S., 4,177,098, Cl. 156-80.000.

Silonics, Inc.: *See—*
Mitchell, Charles S., 4,177,471, Cl. 346-140.00R.

Simecek, Tomislav: *See—*
Sipek, Emil; and Simecek, Tomislav, 4,176,962, Cl. 356-400.000.

Simkanich, John J.: *See—*
Hoinski, Walter W.; and Simkanich, John J., 4,177,460, Cl. 340-576.000.

Simmonds Precision Products, Inc.: *See—*
Hiscock, Benjamin E., 4,177,502, Cl. 362-218.000.

Simmons, James W., Jr., to Cox Foundry & Machine Co. Rotating driving mechanism for imparting reciprocatory motion to a driven element. 4,176,692, Cl. 139-21.000.

Simonson, Robert C.; and Stroud, Ruben J. Child's bumper bike. 4,176,851, Cl. 280-259.000.

Sims, Anson; and Jones, Lawrence T., to California R & D Center. Magnetized toy with removable appendages. 4,176,492, Cl. 46-22.000.

Sinclair, Rex, to Altec Corporation. Two-section exponential acoustical horn. 4,176,731, Cl. 181-192.000.

Singer Company, The: *See—*
Batson, William A., 4,176,571, Cl. 83-397.000.
Davidson, Donald R., 4,176,561, Cl. 74-424.80A.

Singer, Roger M., to United Technologies Corporation. Catalytic dry powder material for fuel cell electrodes comprising fluorocarbon polymer and precatalyzed carbon. 4,177,159, Cl. 252-428.000.

Siozawa, Nobuo; Kikuchi, Uhee; Kimura, Suguru; Todoroki, Nobuaki; Yasukawa, Jun-ichi; and Kamiyama, Satoru, to Taikisha Ltd.; Honda Motor Co., Ltd.; and Shinto Paint Co., Ltd. Method for supplying binder into a coating bath and its apparatus. 4,177,123, Cl. 204-181.00C.

Sipek, Emil; and Simecek, Tomislav, to Ceskoslovenska akademie ved. Method for determining a straight line intersecting the axis of an optical radiation beam of a photoelectric levelling apparatus and arrangement for execution of this method. 4,176,962, Cl. 356-400.000.

Sittig, Roland: *See—*
DeBruyne, Patrick; and Sittig, Roland, 4,177,479, Cl. 357-38.000.

Sittler, Eduard: *See—*
Kubanek, Vladimir; Basarova, Gabriela; Kralicek, Jaroslav; Skach, Josef; Fencl, Zdenek; Budin, Jiri; Kondelikova, Jaroslava; and Sittler, Eduard, 4,177,295, Cl. 426-330.300.

Siu, Ting Y.; and Ackley, Daniel, to Tenneco Chemicals, Inc. Fabric-conditioning article for use in a clothes dryer. 4,177,151, Cl. 252-8.600.

Sivertsen, Marvin L.: *See—*
Gray, David A.; and Sivertsen, Marvin L., 4,176,826, Cl. 254-175.000.

Skach, Josef: *See—*
Kubanek, Vladimir; Basarova, Gabriela; Kralicek, Jaroslav; Skach, Josef; Fencl, Zdenek; Budin, Jiri; Kondelikova, Jaroslava; and Sittler, Eduard, 4,177,295, Cl. 426-330.300.

Skinner, Geoffrey F.: *See—*
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Skinner, Robert T. J., to Lucas Industries, Limited. Fuel injection pumping apparatus. 4,176,640, Cl. 123-139.0AQ.

Skow, Andrew M.: *See—*
Headley, Jack W.; Skow, Andrew M.; and Titiriga, Andrew, Jr., 4,176,813, Cl. 244-130.000.

Slanski, John M.: *See—*
Fiore, Joseph V.; and Slanski, John M., 4,176,668, Cl. 131-17.00A.

Slawyk, Wilhelm: *See—*
Bock, Manfred; Pedain, Josef; Slawyk, Wilhelm; and Konig, Klaus, 4,177,342, Cl. 528-45.000.

Smakman, Robert, to Akzona Inc. Method for removing a weak acid from an aqueous solution. 4,177,140, Cl. 210-37.00R.

Smetanin, Jury G.: *See—*
Krupman, Leonid I.; Yaroslavtsev, Jury G.; Sochnev, Alexandr E.; Shamil, Jury P.; Khitrik, Abram I.; Antipenko, Grigory I.; Smetanin, Jury G.; Samsonov, Albert N.; Ljudkovsky, Vadim M.; Pokrass, Leonid M.; Kurdjukov, Anatoly A.; Ofengenden, Abram M.; and Zhitnik, Georgy G., 4,177,070, Cl. 75-257.000.

Smith, Alfred H., Jr., to General Electric Company. Primer compositions for adhering silicone compositions. 4,177,301, Cl. 427-401.000.

Smith, Donald H.: *See—*
Patterson, Thomas K.; Mitchell, William O.; Smith, Donald H.; and Hunter, John P., Jr., 4,176,566, Cl. 83-29.000.

Smith, George. Motorized lens ring adjustor for still camera lens. 4,176,935, Cl. 354-195.000.

Smith International, Inc.: *See—*
Vezirian, Edward, 4,176,724, Cl. 175-369.000.

Smith-Johannsen, Robert: *See—*
Horsma, David A.; Lyons, Bernard J.; and Smith-Johannsen, Robert, 4,177,376, Cl. 219-553.000.

Smith, John B.; Bell, Peter W.; Queen, David S.; and Mitchell, John, to Sidlaw Industries Limited. Composite fabric. 4,177,311, Cl. 428-246.000.

Smith, Michael J.: *See—*
Mathews, John P.; and Smith, Michael J., 4,177,327, Cl. 429-27.000.

Smith, Philip N., to Standex International Corporation. Reed relay and method of assembly. 4,177,439, Cl. 335-151.000.

Smith, Thomas H.: *See—*
Wu, Helen Y.; Smith, Thomas H.; and Henry, David W., 4,177,264, Cl. 424-180.000.

Smithgall, David H., Sr.: *See—*
Frazee, Ralph E., Jr.; and Smithgall, David H., Sr., 4,176,961, Cl. 356-355.000.

Smiths Industries Limited: *See—*
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Manara, Giovanni; Notari, Bruno; and Fattore, Vittorio, 4,177,167, Cl. 252-455.00R.

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Societe d'Exploitation des Procedes Marechal SEPM: *See—*
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Societe Fiat France, S.A.: *See—*
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Societe pour le Forgeage et l'Estampage des Alliages Legers FORGEAL: *See—*
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Soda, Kazuya: *See—*
Suzuki, Masatosi; Soda, Kazuya; and Nakamura, Yasuo, 4,177,112, Cl. 204-1.00T.

Sohner, Gerhard: *See—*
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Solarco Corporation: *See—*
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Solex Research Corporation: *See—*
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Solid Photography Inc.: *See—*
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Solomon, Fred F.: *See—*
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Solow, Benjamin, to Angstrohm Precision, Inc. Metal foil resistor. 4,176,445, Cl. 29-620.000.

Soltis, Frank G.: *See—*
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Sommer, Reinhold. Tennis racket. 4,176,841, Cl. 273-73.00H.

Sommers, Richard J., to FMC Corporation. Fish holding pan on traveling water screen and method of flushing same. 4,176,984, Cl. 405-81.000.

Sonnenschein, Charles M.: *See—*
Keene, Wayne H.; Rudko, Robert I.; and Sonnenschein, Charles M., 4,176,959, Cl. 356-325.000.

Sony Corporation: *See—*
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Yamagiwa, Kazuo; and Tada, Masahiro, 4,177,481, Cl. 358-8.000.
Sorensen, Norman L., to Wisco Corporation. Wind deflector. 4,176,876, Cl. 296-137.00J.
Souriau et Cie: *See—*
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Sourirajan, Srinivasa: *See—*
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Southwire Company: *See—*
Chadwick, Kenneth E.; Chia, E. Henry; and Powers, Frank M., 4,177,085, Cl. 148-2.000.
Spectra-Physics, Inc.: *See—*
Wright, Dave L.; Schuda, Felix J.; and Spranza, Joseph J., III, 4,176,892, Cl. 316-19.000.
Speer, Kenneth. Ceramic ferrule. 4,176,612, Cl. 110-323.000.
Spence-Bate, H. A. H.: *See—*
Spence-Bate, Harry A. H.; and Bain-Smith, Timothy, 4,176,947, Cl. 355-53.000.
Spence-Bate, Harry A. H.; and Bain-Smith, Timothy, to Spence-Bate, H. A. H. Step and repeat mechanism. 4,176,947, Cl. 355-53.000.
Spence-Bate, Harry A. H. Recording and copying camera. 4,176,948, Cl. 355-53.000.
Sperry Rand Corporation: *See—*
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Kroger, Harry; and Jillie, Don W., Jr., 4,177,476, Cl. 357-5.000.
Spetsialnoe Knostruktorskoe Bjuro PO Proektirovaniju Shlifovalnogo Oborudovania: *See—*
Gebel, Iosif D.; Zykov, Arkady A.; Nefedov, Askold I.; Parshikov, Viktor I.; and Khrolenko, Viktor F., 4,176,461, Cl. 33-178.00D.
Spielhoff, Horst: *See—*
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Sprague, Peter J.: *See—*
Hergenrother, George R.; and Sprague, Peter J., 4,177,400, Cl. 313-477.00R.
Spranza, Joseph J., III: *See—*
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SRI International: *See—*
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Stacey, Martyn H.: *See—*
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Staff KG: *See—*
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Staheli, Paul: *See—*
Lattmann, Werner; and Staheli, Paul, 4,176,988, Cl. 406-171.000.
Stahle, Kurt, to Concordia Fluidtechnik GmbH. Flow control valve for liquids. 4,176,686, Cl. 137-604.000.
Stalder, Herbert, to Rieter Machine Works Ltd. Method of controlling the operating conditions of a ring spinning machine and apparatus for implementing the method. 4,176,514, Cl. 57-261.000.
Standard Oil Company: *See—*
Kruse, Larry W., 4,177,137, Cl. 208-321.000.
Standard Oil Company (Indiana): *See—*
Feinstein, Allen I.; Bertolacini, Ralph J.; and Kim, Dae K., 4,177,219, Cl. 585-489.000.
Standard Oil Company (Ohio), The: *See—*
Herrington, Daniel R.; and Schwerko, Albert P., 4,177,136, Cl. 208-215.000.
Standex International Corporation: *See—*
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Stanek, Jaroslav: *See—*
Baschang, Gerhard; Stanek, Jaroslav; Rossi, Alberto; and Sele, Alex, 4,177,344, Cl. 536-4.000.
Starks, Laura A.: *See—*
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Stas Societe Technique d'Accessoires Specialises: *See—*
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Stauffer Chemical Company: *See—*
Richard, Wilfred T., 4,177,248, Cl. 423-540.000.
Walsh, Edward N.; and Fearing, Ralph B., 4,177,300, Cl. 427-390.00D.
Stauffer, Reuben L., to Bendix Corporation, The. Pulse time addition circuit for electronic fuel injection systems. 4,176,625, Cl. 123-32.0EH.
Stead, George E.: *See—*
Heiba, El-Ahmadi I.; Kinney, Robert E.; and Stead, George E., 4,177,192, Cl. 260-326.220.
Steckel, Lester M. Ear tag. 4,176,482, Cl. 40-301.000.
Steeves, Robert W., to King Seeley Thermos Company. Method of metallizing paper. 4,177,310, Cl. 428-216.000.
Steeves, Robert W., to King Seeley Thermos Company. Method of printing paper. 4,177,314, Cl. 428-336.000.
Stein, Erich: *See—*
Bischoff, Erich; Dangel, Jurgen; Schussler, Hans; Ricker, Thomas; and Stein, Erich, 4,176,442, Cl. 29-571.000.
Stein, Manfred; and Busch, Dieter, to Quarz-Zeit AG. Electronic clock, particularly a quartz clock. 4,176,515, Cl. 58-19.00R.
Steinke, Leo: *See—*
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Stendenbach, Karl-Heinz: *See—*
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Stenkvist, Sven-Einar; and Widell, Bjorn, to ASEA Aktiebolag. Method for making iron-chromium alloys. 4,177,061, Cl. 75-11.000.
Stepan Chemical Company: *See—*
Nussbaum, Marvin L.; and Knaggs, Edward A., 4,177,207, Cl. 260-504.00R.
Stern, Howard K.: *See—*
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Stevens, William M., to Randam Electronics, Inc. Long-lived reference cell simulating the α scintillation of radon-222. 4,177,378, Cl. 250-252.000.
Stevenson, Grant E., to Nelson & Johnson Engineering. Manual compactor. 4,176,597, Cl. 100-244.000.
Stewart-Warner Corporation: *See—*
McCook, Thomas J.; and Shragal, John F., 4,177,497, Cl. 361-331.000.
Stieger, Frank: *See—*
Gordon, Michael E.; and Stieger, Frank, 4,177,330, Cl. 429-152.000.
Stierlin, Hans; and Ferguson, John R., to Kuhlapparate GmbH SIBIR. Absorption refrigerating unit. 4,176,529, Cl. 62-490.000.
Stiftelsen Institutet for Mikrovagsteknik vid Tekniska Hogskolan I Stockholm: *See—*
Andermo, Ingvar, 4,177,463, Cl. 343-8.000.
Stiling, Rodney A., to National Gypsum Company. Coaxial pump mixer. 4,176,972, Cl. 366-304.000.
Stoddard, Xerxes T.; Vaseen, Vesper A.; and Terry, Ruel C. Wet oxidation of materials. 4,177,246, Cl. 423-437.000.
Stoddard, Xerxes T.; Vaseen, Vesper A.; and Terry, Ruel C. Wet oxidation of sulphur and the capture of generated heat. 4,177,249, Cl. 423-522.000.
Stoepel, Kurt: *See—*
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Stoll, Kurt; and Rudle, Manfred. Piston and cylinder device. 4,176,586, Cl. 92-5.00R.
Stollberg, Ray H., to Crown Zellerbach Corporation. Shipping container. 4,176,745, Cl. 206-423.000.
Stoner, Jesse A.; and Mills, Robert L., to General Electric Company. Apparatus and method of operating. 4,176,693, Cl. 141-1.000.
Stover, Donald E. Fireplace tongs. 4,176,871, Cl. 294-10.000.
Stowell, Donald E.: *See—*
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Strangfeld, Reiner, to Georg Rost & Sohne. Pilot-operated valve assembly. 4,176,821, Cl. 251-38.000.
Strauser, John W. Machine for making wooden bee box components. 4,176,697, Cl. 144-7.000.
Strie, Lothar: *See—*
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Stroud, Ruben J.: *See—*
Simonson, Robert C.; and Stroud, Ruben J., 4,176,851, Cl. 280-259.000.
Stuck, Robert M., to Marshall Air Systems, Inc. Cooking apparatus. 4,176,589, Cl. 99-386.000.
Studebaker, Irving G.; and Hutchins, Ned M., to Occidental Oil Shale, Inc. In situ oil shale retorts with gas barriers for maximizing product recovery. 4,176,882, Cl. 299-2.000.
Stumpe, Klaus: *See—*
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Stuyvenberg, Bernard R. Audio amplitude-responsive lighting display. 4,176,581, Cl. 84-464.00R.
Suhey, Louise D.: *See—*
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Okita, Koichi, 4,177,334, Cl. 521-145.000.
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Sun Chemical Corporation: *See—*
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Sun, Kwok K., to Upjohn Company, The. Process for the preparation of bis(aminophenyl)alkanes. 4,177,211, Cl. 260-570.00D.
Sunami, Hideo; Kubo, Masaharu; and Takemoto, Iwao, to Hitachi, Ltd. Charge transfer semiconductor device. 4,177,391, Cl. 307-221.00D.
Sunbeam Corporation: *See—*
Ernster, Peter J.; Schaefer, George H.; and Neal, Michael G., 4,176,971, Cl. 366-298.000.
Sundstrand Corporation: *See—*
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Thompson, Robert M., 4,177,222, Cl. 525-432.000.

Supanich, Joseph: *See*—
Ahlen, Karl G.; Bergstrom, Per-Olof; and Supanich, Joseph, 4,176,564, Cl. 74-732.000.

Suzue, Seisuke: *See*—
Yoshimura, Tatsushiro; Namba, Mutsusuke; Suzue, Seisuke; Tominaga, Shigetake; Mizuno, Toshio; and Hayashida, Nariyoshi, 4,177,320, Cl. 428-419.000.

Suzuki, Masao: *See*—
Fujimoto, Yasuhiro; and Suzuki, Masao, 4,177,360, Cl. 179-100.41M.

Suzuki, Masatosi; Soda, Kazuya; and Nakamura, Yasuo, to Nippondenso Co., Ltd. Oxygen concentration detector and method of use thereof. 4,177,112, Cl. 204-1.00T.

Suzuki, Takashi: *See*—
Kurihara, Kenji; Kasahara, Shigekazu; and Suzuki, Takashi, 4,177,179, Cl. 260-29.6NR.

Suzuki, Yoshihiro; Ura, Mitsuru; and Takahashi, Hiroshi, to Hitachi, Ltd. Silver-electroplating process. 4,177,114, Cl. 204-38.00B.

Svacek, Joseph F., III: *See*—
Dixon, Richard W.; and Svacek, Joseph F., III, 4,177,436, Cl. 331-94.50S.

Swarts, William A.: *See*—
Mageli, Orville L.; and Swarts, William A., 4,177,204, Cl. 260-453.0RZ.

Swartzon, Jackob: *See*—
Tucker, James M.; Dougan, Roger W.; and Swartzon, Jackob, 4,176,525, Cl. 62-238.00R.

Sweat, Tommy: *See*—
Griner, Henry; Griner, Wade; Hyars, Claude; and Sweat, Tommy, 4,176,509, Cl. 56-27.500.
Griner, Henry; Griner, Wade; Hyars, Claude; and Sweat, Tommy, 4,176,510, Cl. 56-27.500.

Sweet Manufacturing Ltd.: *See*—
Poggemiller, Erhard; and Sweet, Ralph, 4,176,721, Cl. 172-4.000.

Sweet, Ralph: *See*—
Poggemiller, Erhard; and Sweet, Ralph, 4,176,721, Cl. 172-4.000.

Swegea Maschinen AG: *See*—
Nilsson, Erik G., 4,176,568, Cl. 83-187.000.

Swett, Benson P.: *See*—
Barr, Dwight L.; Barr, Leslie A.; Swett, Benson P.; and Ray, Charles M., 4,176,873, Cl. 296-156.000.

Swiss Aluminium Ltd.: *See*—
Clumpner, Joseph A., 4,177,065, Cl. 75-93.00E.
Clumpner, Joseph A., 4,177,066, Cl. 75-93.00E.
Severus, Harald; and Birkmaier, Horst, 4,177,299, Cl. 427-287.000.
Severus-Laubenfeld, Harald, 4,177,127, Cl. 204-207.000.

Syntex (U.S.A.) Inc.: *See*—
Untch, Karl G.; Berkoz, Belig; and Unger, Stefan H., 4,177,280, Cl. 424-272.000.

Syred, Nicholas: *See*—
Cudby, Joseph W.; King, Christopher F.; and Syred, Nicholas, 4,176,769, Cl. 222-591.000.

Systems and Technics S.A.: *See*—
Repetti, Pierre, 4,176,670, Cl. 133-4.00R.

Szarka, Sandor, to Precision Screen Machines, Inc. Automated towel transfer printing, feeding, drying and folding apparatus. 4,176,601, Cl. 101-115.000.

Szeberenyi, Szabolcs: *See*—
Tuba, Zoltan; Marsai, Maria; Biro, Katalin; Szporny, Laszlo; Karpati, Egon; and Szeberenyi, Szabolcs, 4,177,190, Cl. 260-239.500.

Szostakowski, Henryk: *See*—
Bielecki, Marek; Bogdanski, Andrzej; Buxakowski, Andrzej; Chudzinski, Janusz; Glogowski, Andrzej; Kopczynski, Marian; Krolikowski, Andrzej; Kryszewski, Jozef; Moczulski, Zdzislaw; Ochocki, Wlodzimierz; Pomorski, Aleksander; Rumatowski, Karol; Sawicki, Janusz; Szostakowski, Henryk; Warowny, Tadeusz; Wisniewski, Teofil; and Wozniak, Antoni, 4,176,624, Cl. 123-32.0EA.

Szporny, Laszlo: *See*—
Tuba, Zoltan; Marsai, Maria; Biro, Katalin; Szporny, Laszlo; Karpati, Egon; and Szeberenyi, Szabolcs, 4,177,190, Cl. 260-239.500.

Taber, Russell E. Rack and golf cart. 4,176,752, Cl. 211-120.000.

Tacke, Peter; Neuray, Dieter; and Michael, Dietrich, to Bayer Aktiengesellschaft. Flameproof polyamide moulding composition. 4,177,185, Cl. 260-38.000.

Tada, Masahiro: *See*—
Yamagiwa, Kazuo; and Tada, Masahiro, 4,177,481, Cl. 358-8.000.

Taddei, Vincent J., to Burroughs Corporation. Port select unit for a programmable serial-bit microprocessor. 4,177,511, Cl. 364-200.000.

Taft, Daniel G.; and Heilhecker, Joe K., to Exxon Production Research Company. Subsea riser and flotation means therefor. 4,176,986, Cl. 405-211.000.

Taguchi, Tetsuya: *See*—
Ito, Fumio; Tsunekawa, Tokuichi; Taguchi, Tetsuya; and Harigaya, Isao, 4,176,929, Cl. 354-29.000.

Taikisha Ltd.: *See*—
Siozawa, Nobuo; Kikuchi, Uhee; Kimura, Suguru; Todoroki, Nobuaki; Yasukawa, Jun-ichi; and Kamiyama, Satoru, 4,177,123, Cl. 204-181.00C.

Taisei Corporation: *See*—
Ito, Yasuro; Kaga, Hideharu; Yamamoto, Yasuhiro; Kuroha, Kenji; and Hayakawa, Mitsutaka, 4,176,965, Cl. 366-8.000.

Takada, Hiroshi: *See*—
Hayashi, Masaaki; Tsuneta, Kazuyoshi; Takada, Hiroshi; Kenmotsu, Nobuhiro; and Sasaki, Hiroharu, 4,177,174, Cl. 260-18.0PN.

Takahashi, Hiroshi: *See*—
Suzuki, Yoshihiro; Ura, Mitsuru; and Takahashi, Hiroshi, 4,177,114, Cl. 204-38.00B.

Takahashi, Koji, to Fuji Photo Film Co., Ltd. Color printer and method of controlling exposure time therefor. 4,176,946, Cl. 355-38.000.

Takahashi, Sankichi: *See*—
Mastuzaki, Harumi; Ebara, Katsuya; and Takahashi, Sankichi, 4,177,138, Cl. 210-22.00C.

Takahashi, Yuji, to Canon Kabushiki Kaisha. Sheet transfer device. 4,176,834, Cl. 271-116.000.

Takaoka, Saburo, to Pioneer Electronic Corporation. Speed-and-phase control circuit for a rotary machine. 4,177,411, Cl. 318-314.000.

Takashima, Hiroaki: *See*—
Uemura, Seiichi; Yamamoto, Syunichi; Hirose, Takao; Takashima, Hiroaki; Kato, Osamu; and Nagi, Minoru, 4,177,132, Cl. 208-22.000.

Takasugi, Wasao, to Hitachi, Ltd. Comparator circuit having multifunctions. 4,177,394, Cl. 307-357.000.

Takemoto, Iwao: *See*—
Sunami, Hideo; Kubo, Masaharu; and Takemoto, Iwao, 4,177,391, Cl. 307-221.00D.

Takenaka, Kunio, to Omron Tateisi Electronics Co. Electronic thermometer. 4,176,556, Cl. 73-362.0AR.

Takenouchi, Mutsuo; Ozawa, Takashi; Wako, Syoji; and Itoh, Satoru, to Fuji Xerox Co., Ltd. Facsimile scanner. 4,177,487, Cl. 358-294.000.

Taki, Minoru, to Fukada Works, Ltd. Time lag fuse. 4,177,444, Cl. 337-163.000.

Takishima, Yoshiyuki: *See*—
Kozuki, Susumu; Uchidoi, Masanori; Date, Nobuaki; Shimizu, Masami; Aizawa, Hiroshi; and Takishima, Yoshiyuki, 4,176,936, Cl. 354-38.000.

Talbott, John W.; and Kirkwood, John M., to Washington State University Research Foundation, Inc. Method and apparatus for induction and dispersion of particles in an airstream. 4,176,798, Cl. 241-39.000.

Tamm, Rolf G. A.: *See*—
Tomoff, Toma; and Tamm, Rolf G. A., 4,176,956, Cl. 356-312.000.

Tanaka, Hiroaki: *See*—
Hagiuda, Nobuyoshi; and Tanaka, Hiroaki, 4,176,924, Cl. 352-174.000.

Tanaka, Tadashi: *See*—
Obi, Tatsuro; Koyama, Teruo; Tanaka, Tadashi; and Hasegawa, Atsushi, 4,177,323, Cl. 428-622.000.

Tanaka, Taro: *See*—
Noguchi, Masaaki; Tanaka, Yukiyasu; and Tanaka, Taro, 4,176,650, Cl. 123-198.00F.

Tanaka, Yukiyasu: *See*—
Noguchi, Masaaki; Tanaka, Yukiyasu; and Tanaka, Taro, 4,176,650, Cl. 123-198.00F.

Targe, David M., to Newsday, Inc. Read-away flap. 4,176,862, Cl. 283-64.000.

Tatsumi, Susumu; and Kuroishi, Shoji, to Ricoh Company, Ltd. Electrophotographic copying apparatus. 4,176,942, Cl. 355-14.00R.

Taube, Andris: *See*—
Taube, John; and Taube, Andris, 4,176,931, Cl. 354-79.000.

Taube, John; and Taube, Andris. Camera to microscope adapter system with peripheral image averaging means for exposure control. 4,176,931, Cl. 354-79.000.

Taylor, Richard H.: *See*—
Hatter, Edward E.; Taylor, Richard H.; and McGunigle, Richard D., 4,176,454, Cl. 433-119.000.

Tazaki, Kichiya: *See*—
Tsurumi, Michio; Sakakiyama, Takashi; Tazaki, Kichiya; and Koyama, Masaoki, 4,177,181, Cl. 260-29.70H.

Techniques Europeennes de Commutation (T.E.C.): *See*—
Merlette, Didier, 4,177,440, Cl. 335-247.000.

Teledyne Industries, Inc.: *See*—
Campbell, Joseph M.; and Minyard, Larry J., 4,176,578, Cl. 84-115.000.

Tellabs, Inc.: *See*—
Birck, Michael J., 4,177,361, Cl. 179-170.200.

Tellert, Rudy, to Sachs Systemtechnik GmbH. Circuit arrangement for producing an open magnetic field. 4,177,494, Cl. 361-152.000.

Temple University: *See*—
Labes, Mortimer M., 4,176,918, Cl. 350-346.000.

Tenneco Chemicals, Inc.: *See*—
Siu, Ting Y.; and Ackley, Daniel, 4,177,151, Cl. 252-8.600.

Teramachi, Hiroshi. Limited sliding ball spline assembly. 4,176,888, Cl. 308-6.00R.

Terpening, George I., to Acro Matic Inc. Stocking knee brace. 4,176,665, Cl. 128-165.000.

Terris, James M. Directional sign. 4,176,484, Cl. 40-584.000.

Terris, James M. Directional sign. 4,176,485, Cl. 40-584.000.

Terry, Ruel C.: *See*—
Stoddard, Xerxes T.; Vaseen, Vesper A.; and Terry, Ruel C., 4,177,246, Cl. 423-437.000.
Stoddard, Xerxes T.; Vaseen, Vesper A.; and Terry, Ruel C., 4,177,249, Cl. 423-522.000.

Terumo Corp.: *See*—
Ichikawa, Toshiji; and Minoo, Osamu, 4,177,182, Cl. 260-29.1SB.

Terzian, Rouben T., to Marvin Glass & Assoc. Cooking device. 4,176,593, Cl. 99-422.000.

Tetronics Research & Development Company Limited: *See*—
Tylko, Jozef K., 4,177,060, Cl. 75-10.00R.

Texaco Inc.: *See*—
Howlett, Donald L., 4,177,457, Cl. 340-347.0DA.

Nolte, David G.; and Brown, Winthrop K., 4,176,543, Cl. 73-40.50A.
Sung, Rodney L.; and Von Allmen, Ronald W., 4,177,041, Cl. 44-71.000.

Texasgulf Inc.: *See—*
Pepper, Terry W.; and Bocckino, Harry G., 4,177,067, Cl. 75-104.000.

Textron Inc.: *See—*
Hughes, George C., 4,176,677, Cl. 137-488.000.

Th. Goldschmidt AG: *See—*
Schamberg, Eckehard; Fock, Jurgen; Klocker, Otto; and Esselborn, Eberhard, 4,177,221, Cl. 525-244.000.

Thayer, William L.; Pageau, Lucien; and Sourirajan, Srinivasa, to Canadian Patents and Development Limited. Apparatus for casting tubular, polymeric membranes for reverse osmosis and ultrafiltration. 4,177,031, Cl. 425-460.000.

Thera Gesellschaft fur Patentverwertung mbH: *See—*
Dietze, Gunther; and Wicklmayr, Matthias, 4,177,261, Cl. 424-101.000.

Thiele, Kurt: *See—*
Zirngibl, Ludwig; and Thiele, Kurt, 4,177,350, Cl. 546-278.000.

Thomas, Frank S., Jr., deceased; and by Thomas, Phyllis, executrix. Slide locking mechanism for magazine-fed firearms. 4,176,584, Cl. 89-138.000.

Thomas, Phyllis, executrix: *See—*
Thomas, Frank S., Jr., deceased; and Thomas, Phyllis, executrix, 4,176,584, Cl. 89-138.000.

Thomas, Rudy; and Neumann, Fred F., to N.V. Klippan S.A. Acceleration-sensitive device. 4,176,809, Cl. 242-107.40A.

Thompson, Robert M., to Suntech, Inc. Block copolymer of poly(dioxa-amide) and polyamide. 4,177,222, Cl. 525-432.000.

Thomson-CSF: *See—*
Felix, Pierre, 4,177,483, Cl. 358-113.000.

Thorberg, Seth O.: *See—*
Lindberg, Ulf H. A.; Ross, Svante B.; Thorberg, Seth O.; and Ogren, Sven O., 4,177,291, Cl. 424-330.000.

Thorley, Graham R., to Transportation, Design & Technology, Inc. Wheelchair lift. 4,176,999, Cl. 414-540.000.

Thornburg, David D., to Xerox Corporation. Capacitive transducer. 4,177,421, Cl. 324-61.00R.

Thorpe, Walter H. Emergency traction device. 4,176,704, Cl. 152-225.00C.

Thummler, Ursus; Werner, Hugo; and Sander, Harry, to Hoechst Aktiengesellschaft. Self-cleaning bucket wheel lock. 4,176,765, Cl. 222-218.000.

Thursby, Graham J., to National Research Development Corporation. Diffusing an element into a metal. 4,177,092, Cl. 148-113.000.

Thyssen Industrie Aktiengesellschaft: *See—*
Bornemann, Hans-Joachim, 4,176,966, Cl. 366-78.000.

Thyssen Schachtbau GmbH: *See—*
Hungerbach, Paul, 4,176,997, Cl. 414-299.000.

Tibolla, Marcello: *See—*
Doria, Gianfederico; Romeo, Ciriaco; Lauria, Francesco; Corno, Maria L.; Giraldi, Piernicola; and Tibolla, Marcello, 4,177,276, Cl. 424-263.000.
Doria, Gianfederico; Romeo, Giriaco; Lauria, Francesco; Corno, Maria L.; Giraldi, Piernicola; and Tibolla, Marcello, 4,177,286, Cl. 424-283.000.

Tillmann, Ditmar K.: *See—*
Cairo, Anthony C.; Tillmann, Ditmar K.; and Insley, Gene I., 4,176,903, Cl. 339-147.00R.

Tillmetz, Klaus D.: *See—*
Kolbel, Herbert; and Tillmetz, Klaus D., 4,177,203, Cl. 260-449.60R.

Timashov, Grigory A.: *See—*
Paton, Boris E.; Medovar, Boris I.; Tsukanov, Georgy E.; Bogachenko, Alexei G.; Artamonov, Viktor L.; Timashov, Grigory A.; Shtanko, Jury P.; Marchenko, Alexandr M.; Fedorovsky, Boris B.; Kumysh, Ilya I.; Chepurnoi, Anatoly D.; Saenko, Vladimir Y.; and Semin-Vadov, Gennady M., 4,177,058, Cl. 75-10.00C.

Timco, Gary G. Wave simulator. 4,176,469, Cl. 35-19.00R.

Timothy, Dave A.: *See—*
Baum, Joseph W., Sr.; and Timothy, Dave A., 4,177,009, Cl. 416-45.000.

Timp, Willem J.: *See—*
Akkerboom, Piet J.; Lower, Geertruiida J.; and Timp, Willem J., 4,177,189, Cl. 260-239.100.

Timron, Inc.: *See—*
Kessler, Theodore P., 4,176,803, Cl. 242-67.10R.

Ting, Raymond M. L., to H. H. Robertson Company. Controlled release wall structure. 4,176,503, Cl. 52-1.000.

Tirone, Stephen A.; and Arthur, Ronald H., to AMF Incorporated. Push button switch. 4,177,367, Cl. 200-159.00A.

Titiriga, Andrew, Jr.: *See—*
Headley, Jack W.; Skow, Andrew M.; and Titiriga, Andrew, Jr., 4,176,813, Cl. 244-130.000.

Tkachuk, Petr F.: *See—*
Bezvulyak, Anatoly S.; Gelfand, Ilya M.; Torchinsky, Efim M.; Pushkin, Sergei B.; Vedernikov, Rudolf K.; Kulachenkov, Gennady P.; Tkachuk, Petr F.; and Karyagin, Viktor F., 4,176,952, Cl. 356-47.000.

TMC Corporation: *See—*
Bodendorfer, Roland, 4,176,857, Cl. 280-613.000.

Todoroki, Nobuaki: *See—*
Siozawa, Nobuo; Kikuchi, Uhee; Kimura, Suguru; Todoroki, Nobuaki; Yasukawa, Jun-ichi; and Kamiyama, Satoru, 4,177,123, Cl. 204-181.00C.

Tohyama, Takanori; and Nakahata, Masaaki, to Wako Pure Chemical Industries, Ltd. γ-glutamyl-p-aminoanilide derivatives for measuring activity of γ-glutamyl transpeptidase. 4,177,109, Cl. 435-24.000.

Tojo, Tsutomu, to Olympus Optical Company Limited. Microscope objective lens system. 4,176,912, Cl. 350-175.0ML.

Tokuno, Masateru, to Rengo Co., Ltd. Single facer for manufacturing single-faced corrugated board. 4,177,102, Cl. 156-472.000.

Tokyo Kogaku Kikai Kabushiki Kaisha: *See—*
Kawase, Suminosuke, 4,176,937, Cl. 354-62.000.

Tominaga, Shigetake: *See—*
Yoshimura, Tatsushiro; Namba, Mutsusuke; Suzue, Seisuke; Tominaga, Shigetake; Mizuno, Toshio; and Hayashida, Nariyoshi, 4,177,320, Cl. 428-419.000.

Tomoff, Toma; and Tamm, Rolf G. A., to Bodenseewerk Perkin-Elmer & Co. GmbH. Sample tube mounting structure for flameless atomic absorption spectroscopy. 4,176,956, Cl. 356-312.000.

Tomura, Teruichi: *See—*
Yamane, Mikiya; Tomura, Teruichi; and Watanabe, Yoshio, 4,177,401, Cl. 313-485.000.

Torchinsky, Efim M.: *See—*
Bezvulyak, Anatoly S.; Gelfand, Ilya M.; Torchinsky, Efim M.; Pushkin, Sergei B.; Vedernikov, Rudolf K.; Kulachenkov, Gennady P.; Tkachuk, Petr F.; and Karyagin, Viktor F., 4,176,952, Cl. 356-47.000.

Torii, Yukio; and Nakamura, Takao, to NGK Insulators, Ltd. Thermal shock resistant ceramic honeycomb structures. 4,177,307, Cl. 428-116.000.

Toro Company, The: *See—*
Baumann, James R.; Comer, Robert C.; and Yourczek, Jerome F., 4,176,508, Cl. 56-12.700.

Torossian, Dieran R.; Aubard, Gilbert G.; and Legeai, Jacky M., to Jouveinal S.A. Method of alleviating inflammation by administration of dexamethasone derivatives. 4,177,268, Cl. 424-243.000.

Toukan, Sameeh S.; and Hauptschein, Murray, to Pennwalt Corporation. Fluorinated heterocyclic sulfides. 4,177,351, Cl. 548-325.000.

Towart, Robertson: *See—*
Bossert, Friedrich; Wehinger, Egbert; Heise, Arend; Kazda, Stanislav; Stoepel, Kurt; Towart, Robertson; Vater, Wulf; and Schlossmann, Klaus, 4,177,278, Cl. 424-266.000.

Townsend, Loren R. Means for converting a water drive center pivot irrigation system to air drive. 4,176,676, Cl. 137-344.000.

Toyama, Noboru: *See—*
Nakamura, Norihiko; Toyama, Noboru; and Baika, Toyokazu, 4,176,635, Cl. 123-119.00A.

Toyo Ink Manufacturing Co., Ltd.: *See—*
Sato, Kozi, 4,177,122, Cl. 204-159.160.
Yoshida, Akihiko; Koaki, Akira; Nakano, Takahumi; Miyake, Mitsunao; Kanai, Teijiro; and Misono, Izumi, 4,176,605, Cl. 101-451.000.

Toyo Soda Manufacturing Co., Ltd.: *See—*
Kurihara, Kenji; Kasahara, Shigekazu; and Suzuki, Takashi, 4,177,179, Cl. 260-29.6NR.

Toyoshima, Kiichiro: *See—*
Nemoto, Tsuneo; and Toyoshima, Kiichiro, 4,176,804, Cl. 242-68.500.

Toyota Jidosha Kabushiki Kogyo Kaisha: *See—*
Nakamura, Norihiko; Toyama, Noboru; and Baika, Toyokazu, 4,176,635, Cl. 123-119.00A.

Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Kamiya, Tamotsu; and Miyao, Shigeru, 4,177,023, Cl. 417-540.000.
Nakamura, Norihiko; Kato, Takashi; and Kobayashi, Tatsuo, 4,176,646, Cl. 123-148.00E.
Sasaki, Shiro; Yasumatsu, Jun; and Inukai, Mitsuo, 4,176,808, Cl. 242-107.100.
Shinoda, Yoshio; Kuno, Akira; and Kuroyama, Toshinobu, 4,177,454, Cl. 340-309.400.
Yamanaka, Minoru; and Ii, Akira, 4,177,224, Cl. 261-39.00A.

Toyota Jidosha Kogyo Kabushikikaisha: *See—*
Shinoda, Osamu; Okabayashi, Keiichi; and Nagai, Takanori, 4,176,639, Cl. 123-136.000.

Toyota Motor Company, Ltd.: *See—*
Karlovitz, Bela, 4,176,649, Cl. 123-191.0SP.

Tracy, Raymond: *See—*
Berg, Verland V., 4,176,652, Cl. 126-121.000.

Traenckner, Hans-Joachim; Goossens, John; Kremer, Wolfgang; and Kronke, Heinz, to Bayer Aktiengesellschaft. Aqueous nitrocellulose/alkyd resin dispersion. 4,177,172, Cl. 260-15.000.

Trane Company, The: *See—*
Schlangen, Andrew J.; McClead, Jerry W.; and Garavalia, Thomas A., 4,177,007, Cl. 415-160.000.

Transportation, Design & Technology, Inc.: *See—*
Thorley, Graham R., 4,176,999, Cl. 414-540.000.

Trayco, Inc.: *See—*
Whitney, Thomas M.; and Crosby, Samuel C., 4,176,413, Cl. 4-300.000.

Trebelhorn, Thomas E.: *See—*
Sacher, Eric; and Trebelhorn, Thomas E., 4,176,780, Cl. 235-302.000.

Treiber, Helmut: *See—*
Knor, Bernhard; Payrhammer, Bernd; and Treiber, Helmut, 4,176,964, Cl. 356-444.000.

Triesch, Willi: *See*—
Remberg, Axel; and Triesch, Willi, 4,177,003, Cl. 415-108.000.
Tripp, Charles W. Major and minor short leakage detector. 4,177,420, Cl. 324-51.000.
Triumph Werke Nurnberg A.G.: *See*—
Lendl, Josef, 4,176,976, Cl. 400-124.000.
Trutzschler GmbH & Co. KG: *See*—
Trutzschler, Hermann, 4,176,425, Cl. 19-81.000.
Trutzschler, Hermann, to Trutzschler GmbH & Co. KG. Device for supporting textile fiber bales during bale breaking. 4,176,425, Cl. 19-81.000.
Tsuchitani, Akira: *See*—
Okumura, Tomisaburo; Okazaki, Hiroshi; and Tsuchitani, Akira, 4,177,096, Cl. 148-187.000.
Tsukanov, Georgy E.: *See*—
Paton, Boris E.; Medovar, Boris I.; Tsukanov, Georgy E.; Bogachenko, Alexei G.; Artamonov, Viktor L.; Timashov, Grigory A.; Shtanko, Jury P.; Marchenko, Alexandr M.; Fedorovsky, Boris B.; Kumysh, Ilya I.; Chepurnoi, Anatoly D.; Saenko, Vladimir Y.; and Semin-Vadov, Gennady M., 4,177,058, Cl. 75-10.00C.
Tsunekawa, Tokuichi: *See*—
Ito, Fumio; Tsunekawa, Tokuichi; Taguchi, Tetsuya; and Harigaya, Isao, 4,176,929, Cl. 354-29.000.
Tsuneta, Kazuyoshi: *See*—
Hayashi, Masaaki; Tsuneta, Kazuyoshi; Takada, Hiroshi; Kenmotsu, Nobuhiro; and Sasaki, Hiroharu, 4,177,174, Cl. 260-18.0PN.
Tsurumi, Michio; Sakakiyama, Takashi; Tazaki, Kichiya; and Koyama, Masaoki, to Asahi-Dow Limited. Flame-retardant adhesive compositions. 4,177,181, Cl. 260-29.70H.
Tuba, Zoltan; Marsai, Maria; Biro, Katalin; Szporny, Laszlo; Karpati, Egon; and Szeberenyi, Szabolcs, to Richter Gedeon Vegyeszeti Gyar Rt. Diamino-androstanes and a process for the preparation of the said compounds. 4,177,190, Cl. 260-239.500.
Tucker, James M.; Dougan, Roger W.; and Swartzon, Jackob, to Wylain, Inc. Combined environmental and refrigeration system. 4,176,525, Cl. 62-238.00R.
Tumbleweed Enterprises: *See*—
Griggs, William K.; and Holland, Harry, 4,176,770, Cl. 224-30.00A.
Turner, Richard T.: *See*—
Hoffman, Roy L.; Kempke, William G.; McCullough, John W.; Soltis, Frank G.; and Turner, Richard T., 4,177,513, Cl. 364-200.000.
Turner, Roy C.; and Constable, Philip J., to Drayton Controls (Engineering) Limited. Bridge circuits. 4,177,423, Cl. 324-99.00R.
Tusl, Miroslav: *See*—
Ruzicka, Jan; Lorenz, Jindrich; Marek, Vladimir; and Tusl, Miroslav, 4,176,978, Cl. 401-96.000.
Twickler, Robert G., to Sundstrand Corporation. Combination no-back brake and torque limiter assembly. 4,176,733, Cl. 188-134.000.
Tylko, Jozef K., to Tetronics Research & Development Company Limited. Reduction of stable oxides. 4,177,060, Cl. 75-10.00R.
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Mettler, Mark F.; Faust, Clifford C.; Loichinger, Brant A.; and Forrest, Walter T., 4,176,700, Cl. 150-3.000.
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Lundvall, Donald O., I; Engels, John P.; and Yesconis, Robert R., 4,177,465, Cl. 343-112.00D.
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Mazdiyasni, Khodabakhsh S., 4,177,230, Cl. 264-60.000.
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Franke, John M., 4,176,950, Cl. 356-28.000.
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Rast, Howard E., Jr., 4,176,919, Cl. 350-354.000.
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U.S. Philips Corporation: *See*—
Freiter, Gerhard, 4,176,846, Cl. 274-10.00S.
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van der Burg, Willem J., to Akzona Inc. Tension reducing 2,3,4,4a,9,13b-hexahydro-1H-dibenzo[b,f]pyrido[3,4-d]azepine derivatives. 4,177,275, Cl. 424-256.000.

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Vezirian, Edward, to Smith International, Inc. Rotary rock bit and method of making same. 4,176,724, Cl. 175-369.000.

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von Beckmann, Helmuth, to Canron, Inc. Automatic integrating liner. 4,176,456, Cl. 33-1.00Q.

von Dreusche, Charles F., Jr.; and Barry, Louis T., to Nichols Engineering & Research Corp. Method and apparatus for treating waste material. 4,176,611, Cl. 110-225.000.

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Vysoka skola chemicko-technologicka: *See—*
Kubanek, Vladimir; Basarova, Gabriela; Kralicek, Jaroslav; Skach, Josef; Fencl, Zdenek; Budin, Jiri; Kondelikova, Jaroslava; and Sittler, Eduard, 4,177,295, Cl. 426-330.300.

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Wachter, William J.; and Robbins, Thomas R. Method and apparatus for storing nuclear fuel assemblies in maximum density racks. 4,177,386, Cl. 250-507.000.

Wacker-Chemie GmbH: *See—*
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Wade, Peter C.; Vogt, B. Richard; and Kissick, Thomas P., to E. R. Squibb & Sons, Inc. 2-Alkyl-3-(substituted hydrazino)benzisothiazolines. 4,177,191, Cl. 548-212.000.

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Wagner, Graham L.: *See—*
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Wagner, Richard E., to Bell Telephone Laboratories, Incorporated. Devices for monitoring, switching, attenuating or distributing light. 4,176,908, Cl. 350-96.150.

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Wakatake, Yoshimasa, to Nihon Advanced Products Kabushiki Kaisha. Display panel and display elements therefor. 4,177,458, Cl. 340-373.000.

Wakatsuki, Goroei: *See—*
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Wakayama Iron Works, Ltd.: *See—*
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Wako Pure Chemical Industries, Ltd.: *See—*
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Wako, Syoji: *See—*
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Walker, Robert G., to Industra Products, Inc. Method and apparatus for assembling dynamoelectric machine stators. 4,176,444, Cl. 29-596.000.

Wallace Knight Limited: *See—*
Knight, Ronald E., 4,177,383, Cl. 250-492.00R.

Wallace, Malcolm R., to Plessey Handel und Investments AG. Flame detection arrangements and the like. 4,177,033, Cl. 431-78.000.

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Wallace, Walter M.; and Craven, Geoffrey F., to Nortn-Harty Colliery Engineering Limited. Materials separation. 4,176,749, Cl. 209-457.000.

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Walts, John M., to Johnson & Johnson. Shampoo. 4,177,171, Cl. 252-541.000.

Wang, Patrick, to Johnson Electric Industrial Manufactory Limited. Electric motors. 4,177,396, Cl. 310-68.00C.

Wang, Wan-Ching, to Kodama Taiwan Industrial Co., Ltd. Frame structure for soft-shelled luggage. 4,176,734, Cl. 190-49.000.

Wanzenberg, Andrew K.: *See—*
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Wappling, Rune A., to Sca Development Aktiebolag. Paper surface treating device. 4,176,619, Cl. 118-410.000.

Warden, A. Jack. Method for producing integrally sealed billets from scrap metal without fully remelting the metal. 4,176,438, Cl. 29-403.100.

Warkentin, James D.: *See—*
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Watanabe, Morio; and Nishimura, Sanji, to Solex Research Corporation. Process for recovery of waste H_2SO_4 and HCl. 4,177,119, Cl. 204-151.000.

Watanabe, Sakuji, to Nippon Kogaku K.K. Indicating apparatus for camera. 4,176,933, Cl. 354-127.000.

Watanabe, Tsutomu: *See—*
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Way, Allan S.; and Reid, Taylor A., to Beckman Instruments, Inc. Automatic loop gain adjustment for optical null spectrophotometers. 4,176,958, Cl. 356-321.000.

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Wehe, Robert L.: *See—*
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Wehinger, Egbert: *See—*
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Wehling, Karl, to Staff KG. Connection for electric light rails. 4,176,896, Cl. 339-29.00R.

Weinert, Harry F.; McCart, Larry D.; and Weisgerber, David J., to Cascade Corporation. Rotatable load clamp adapted for selective load positioning in response to selective rotational positioning of clamp. 4,177,000, Cl. 414-620.000.

Weisberg, Warren. Method of making a tear line-forming perforation in a sealed marginal portion of a bag and a sealed bag formed thereby. 4,176,567, Cl. 83-30.000.

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Weiss, Rudolf; Kiessling, Werner; and Wiedemann, Otto, to Agfa-Gevaert AG. Roll film cassette. 4,176,938, Cl. 354-275.000.

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Welgan, Peter R. Camera rain shield. 4,176,701, Cl. 150-52.00J.

Wella Aktiengesellschaft: *See—*
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Welna, Walton W.; and Frank, Lowell C., to Minnesota Mining & Manufacturing Company. Thermal stabilization of soil. 4,177,078, Cl. 106-67.000.

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McCroskery, Allan L., 253,600, Cl. D18-1.000.
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Kobayashi, Kunihiko: *See—*
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Takei, Hideo, 253,592, Cl. D14-34.000.
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Mericle, Robert W.: *See—*
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Pomroy, James F., 253,570, Cl. D7-9.000.
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Atkinson, Wallace E., 253,577, Cl. D8-338.000.
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